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LIST OF ABBREVIATIONS AND ACRONYMS

BRDC	Biotechnology Research and Development Corporation
BRITE/EURAM	Industrial Manufacturing Technologies
	European Research in Advanced Materials
CABBIO	Centro Argentino-Brasileño de Biotecnologia
CIS	Center for Integrated Systems (Stanford University)
CMLR	Common Market Law Review
CMR	Common Market Review
DOJ	Department of Justice (United States)
DPCI	Droit et pratique du commerce international
EC/EEC	European Economic Community
EC Of. J.	Official Journal of the European Community
EEIG	European Economic Interest Grouping
EIPR	European Intellectual Property Review
ELR	European Law Review
ESPRIT	European Strategic Programme for Research and Development in Information Technology
EUREKA	European Research Co-ordination Agency
GRUR International	Gewerblicher Rechtsschutz und Urheberrecht (Internationaler Teil)
ICOT	Institute for New Generation Computer Technology
IIC	International Review of Industrial Property and Copyright Law
ILM	International Legal Materials
IPRs	Intellectual property rights
JOCE	Journal Officiel de la Communauté Européenne
MCC	Microelectronics and Computer Technology Corporation
NCRA	National Cooperative Research Act (United States)
OAPI	African Intellectual Property Organization
OECD	Organization for Economic Co-operation and Development
PCT	Patent Co-operation Treaty
RACE	Research and Development Programme in Advanced Communication Technologies in Europe
R and D	Research and development
SRC	Semiconductor Research Corporation
WIPO	World Intellectual Property Organization

INTRODUCTION

1. Interfirm collaboration in research and development (hereafter referred to as R and D), particularly in high-technology industries, has flourished in recent years because of intensifying competition for global markets, rapid obsolescence of new products, rising development costs and considerable risks regarding performance and market size among other aspects. Even large companies have been compelled to work together by the need to share the costs and risks of R and D to acquire new technologies, to gain access to the complementary knowledge required to launch a new product on the market and to succeed in entering foreign markets. In this context, R and D co-operation agreements are becoming an increasingly important channel for the transfer of technology among firms. Companies have to share and give up part of their background knowledge in order to absorb the complementary skills of the partner(s) which may be necessary to develop a new product or process. In other words, companies must look beyond their own R and D as the dominant source of new technological knowledge and be increasingly ready to exchange their knowledge in order to maintain or strengthen their competitive position. Everything seems to indicate "that a company's competitive position no longer depends only on its internal capabilities; it also depends on the type of relationships it has been able to establish with other firms and the scope of these relationships".[1] In this connection, R and D collaboration agreements have become part of the complex networks of "strategic alliances" built up basically by companies from developed market-economy countries. The "raison d'être" of these alliances are essentially transactions in information. As new technologies have emerged in the last decade, the information requirements of companies have dramatically increased.

2. Research and development collaboration agreements may focus on generic or precompetitive research or be directed towards the creation and development of a new marketable process or product. They may involve partners with different financial capabilities or size, and may also include co-operation in manufacturing, licensing, distributing or marketing the results of the joint research activities. They differ significantly from the earlier generation of "traditional joint ventures" between firms from OECD countries and from the so-called "new forms of foreign investments" that took place in developing countries in the 1970s.[2] These "new forms" of foreign investment, such as licensing agreements, know-how and turnkey contracts imply a one-way transfer of technology i.e., a supplier of technology-receiving a royalty payment or some other form of remuneration in exchange for the knowledge transferred. In addition, these agreements bear generally on proven or existing technology which the recipient intends to absorb and put into operation. In a north-south context, co-operation between supplier and acquirer is usually in those aspects that are related to the proper implementation and absorption of the technologies and does not encompass the creation of a new product or process.[3] Other channels for transfers to developing countries which have gained importance in recent years, such as joint ventures, are also generally limited to the transfer of technologies that are not *avant garde* or within the core competence of companies.[4] In contrast, what basically distinguishes an R and D agreement from the above-mentioned forms of transfer of technology is the fact that the cooperating partners are both acquirers and suppliers of technology. The barter of technological information and knowledge based on reciprocity is therefore institutionalized by means of a contract. The contract provides the means to enforce such reciprocity and allows parties to combine the complementary technologies necessary to develop a new product or process.

3. The high risks and cost of R and D, the tendency of companies to under-invest in research

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1 See "Marriages of convenience", *Financial Times*, 29 May 1990, quoting the Vice-President of an Italian computer company.

2 The way in which they differ from the so-called new forms of investments in developing countries was studied by C. Oman in *New Forms of International Investment in Developing Countries* (Paris, OECD, 1984) and also mentioned in an OECD study on *International Investment and Multinational Enterprises* (Paris, 1987), p.24; and in the UNCTAD paper on "The role of international collaboration arrangements in developing countries' exports of manufactures" (UNCTAD/ITP/32), 10 May 1990.

3 It should be noted, however, that licensing agreements bearing on existing technology but making provision for the communication of improvements could be an exception to this. Such agreements involve a higher degree of co-operation and may pave the way for more complex forms of technological co-operation among enterprises. This is also the reason why licensing agreements are included in the data bases concerning technological collaboration between enterprises (see annex).

4 See the recent study by the UNCTAD secretariat on "The relevance of recent developments in the area of technology to the negotiations on the draft international code of conduct on the transfer of technology" (TD/CODE TOT/55), 2 October 1990, p.11.

with no direct industrial applications, and the benefits deriving from the diffusion of new knowledge among companies, have led firms to channel and co-ordinate research through independent organizations (e.g. research corporations) to which vast numbers of competitors have access and which produce generic knowledge or technology packages for their members. For the same reasons mentioned above, governments have embraced the idea that more direct collaboration must be encouraged. Hence, many of them support the creation of interfirm linkages and the diffusion of information among companies by means of R and D programmes. Through some of these programmes, companies receive financial support and are required to carry out joint R and D according to certain standard rules or model contracts issued by the sponsoring agency and aimed at ensuring a wide diffusion of the results of the R and D among a huge number of companies.[5] Another tool increasingly used by many developed market-economy countries to promote R and D collaboration is the liberalization of competition laws. In the United States, the shift away from the *per se* condemnation of restrictive practices has led to greater reliance on the *doctrine of the rule of reason*, and thus to the evaluation of the economic effects of R and D collaboration agreements on a case-by-case basis. Nowadays, courts as well as anti-trust enforcement agencies tend to determine on a case-by-case-basis whether anti-competitive practices may be outweighed by pro-competitive efficiencies generated through R and D collaborative efforts. Under this approach, an increasing number of restrictive practices traditionally regarded as unlawful are likely to be accepted, provided that they contribute to technological innovation and greater efficiency. Similarly, in recent years, the European Community has shown more flexibility with respect to R and D collaboration agreements or joint ventures. By means of the Block Exemption concerning R and D agreements and individual exemptions granted under Article 85(3) of the Treaty of Rome, the Commission accepted a large number of R and D collaboration agreements involving the joint exploitation, distribution and even marketing of the results derived from the joint R and D. Many of these agreements involved competitors having a substantial market share in the common market and even in world markets.[6]

4. Ownership, protection and exploitation of the results are also crucial elements of R and D collaboration agreements. On many of these issues, national legislations differ or have not yet been satisfactorily developed. For instance, laws of the EEC Member States differ on matters of ownership and the scope of protection afforded by patents, not to mention other forms of protection. Differences between European and non-European laws are even greater. The same can be said with regard to co-ownership of inventions. Furthermore, the ownership of some rights may differ from that of other rights even for the same innovation, and the right to control know-how may vary according to the type of information concerned. As the rules on copyright, patents and know-how also differ in some States, software and technical aspects of the same project may lie with different parties.[7] Thus, in the absence of any express agreement on such questions, parties are left with the solution provided by the proper law of the contract or the mandatory regulations of the place in which the invention has been made. In this connection, it is of the utmost importance to determine how the results of the research are to be protected and how intellectual property rights, such as patents, will be managed and distributed among the partners.[8]

5. The data bases included in the annex show that interfirm co-operation agreements bearing on technology considerably increased in the 1980s. They are mainly concentrated in the field of advanced technologies, e.g., information technologies and electronics and, to a lesser extent, the aircraft industry. Technological co-operation takes place principally among Japanese, European and United States firms. As the FOR Data Base of the Montedison group shows, almost 40 per cent of 1,883 co-operation agreements examined between 1982 and 1986 involved R and D integration. Another interesting finding reflected in the data is that, from a legal point of view, non-equity forms of co-operation seem to be preferred to equity or corporate joint ventures. Thus, non-equity collaboration agreements account for more than 50 per cent of the arrangements. Furthermore, most of these agreements involved a complex "two-way" technology exchange, pooling or sharing arrangements.

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5 See chapter III below.

6 See chapter V below.

7 K. Hodkinson, "The ownership of intellectual property rights arising from joint R and D and training materials", paper presented at the Conference on Intellectual Property Rights in European Collaborative Research and Training, held at Manchester on 25 and 26 April 1991 and sponsored by the EEC (SPRINT Programme).

8 Technology-sharing clauses and the legal questions related to the ownership, protection and exploitation of the results will be discussed at length in chapter IV below.

6. Interfirm R and D collaboration is taking place mainly in the framework of "strategic alliances" or government-sponsored R and D programmes in industrialized countries.[9] Participation in such R and D schemes is thus principally confined to firms from developed countries owing to technological asymmetries between firms from developing countries and their counterparts from the industrialized world, on the one hand, and the existence of *de jure* and *de facto* rules preventing the participation of foreign companies in government-sponsored R and D programmes or private research consortia or corporations, on the other.[10] Since innovation has become a major source of comparative advantage, firms try to confine the diffusion of new technological knowledge to the members of the research consortia or networks, and, similarly, governments tend to contain the divulgation of the results arising from the programmes they sponsor within national boundaries.

7. Against this background, technological co-operation among developing countries and their enterprises appears even more necessary than in the past. The potential relevance of interfirm R and D collaboration agreements as a channel to technology-sharing and to the transfer of technologies among enterprises in developing countries should, therefore, not be overlooked. The creation of technological links between enterprises in developing countries might help to enhance their bargaining position *vis-à-vis* their counterparts in the industrialized world when it comes to negotiating co-operation or transfer of technology agreements. R and D collaboration agreements may also contribute to enhancing efficiency, to improving applications for existing technologies, or to identifying new ones and to solve technical problems, avoiding duplication of effort and reducing the risks and high costs associated with R and D activities. Interfirm technological co-operation may, in addition, significantly contribute to the technological upgrading of certain regions of the developing world in which integration processes are being deepened.[11]

8. The purpose of this study is to examine interfirm R and D collaboration agreements as a channel for the transfer of technology among enterprises. The analysis is mainly concentrated on four major issues: (1) technology-sharing mechanisms within the framework of government-sponsored R and D programmes and research corporations at pre-competitive stages; (2) technology-sharing mechanisms whereby private firms set up the co-operation framework and exchange their knowledge in order to elaborate a new product or process at competitive stages; (3) the protection, ownership and exploitation of innovations and the intellectual property rights arising therefrom; and (4) competition policies of the European Community and the United States with regard to R and D collaboration agreements.

9. The analysis of these four issues is intended, first, to highlight the mechanisms through which co-operation is effected, and the difficulties that surround the negotiation and implementation of joint R and D between enterprises; and, secondly, to throw some light on the question of whether firms from developing countries could take advantage of such co-operation mechanisms by collaborating with companies from either industrialized or other developing countries.

10. The study is structured as follows: Chapter I contains a brief description of the objectives of R and D collaboration agreements and the criteria for classifying them. Chapter II provides a typology of R and D o-operative agreements, while Chapter III discusses the main technology-sharing mechanisms and principles to which R and D mo-operation parties may be subject within the framework of government-sponsored R and D programmes, as well as private research corporations at a pre-competitive stage. This is done with special reference to three R and D collaboration frameworks at a pre-competitive stage, namely, the Alvey Programme (United Kingdom), the ESPRIT Programme (European Community) and MCC (the Microelectronics and Computer Technology Corporation, a private research company in the United States). Chapter IV deals with the main issues related to the implementation of joint R and D activities and the ownership, protection and exploitation of intellectual property rights within the framework of interfirm R and D collaboration agreements at competitive stages. Chapter V examines the impact of increasing interfirm R and D collaboration on the competition policies of the European Community and the United States. Finally, in chapter VI, the main issues relating to R and D collaboration agreements are summarized and their potential relevance as a mechanism for the transfer of technology to enterprises of developing countries is highlighted.

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9 See data on R and D collaboration agreements in the annex.

10 See S. Ostry, *Governments and Corporations in a Shrinking World. Trade and Innovation Policies in the United States, Europe and Japan* (New York, Council on Foreign Relations Press, 1989), pp. 68 and 88.

11 The relevance of R and D collaboration agreements in developing countries will be discussed in the last chapter of this study.

Chapter I

OBJECTIVES, DEFINITION AND CLASSIFICATION OF R AND D COLLABORATION AGREEMENTS

11. The conclusion of an R and D collaboration agreement requires important management decisions. R and D agreements imply a compromise between a desire to collaborate and the underlying intention of partners to maintain as much independence as possible in order to take advantage of the potential results and new skills to be acquired through collaborative research.[12] In many cases, partners are required to disclose certain background information that may be necessary for the development of a given product. Therefore, managers are called upon to decide what kind of information is to be disclosed and to what extent the other partner may have access to it, as well as make use of it. In this context, the selection of partners is of great significance. Partners must trust each other in order to make appropriate and efficient use of the technological information and knowledge brought into the venture. In the case of horizontal agreements involving competitors engaged in the same segment of the market, parties usually fear that their partners will considerably strengthen their competitive position at their own expense. A geographical partition of markets may therefore be necessary to overcome these concerns, but this restricts competition and may have antitrust implications. This kind of situation is less likely to arise in vertical agreements where complementarities allow the benefits to be distributed according to the respective activities and products.

12. Co-operative R and D can be also a way for large or dominant corporations to avoid competition through innovation, by co-opting potentially innovative rivals and by controlling and slowing down the innovation race.[13]

13. Given the inherent complexities of R and D collaboration agreements, corporations very often favour flexible non-equity contractual forms of collaboration as a means of obtaining the complementary information needed to develop a new product or process.[14] In many instances, eagerness to increase control over the other partner in equity joint ventures may undermine the development of intercompany management skills and discourage innovative initiatives. Furthermore, in order to discover whether complementary capabilities make sense from a technological or market perspective, as well as to determine whether the "corporate cultures" allow firms to work together, flexible non-equity agreements are preferred to mergers. It has been maintained that, "if firms merge before this information is available, much expense in the merging and then the breaking up processes will go to waste. These costs are high, particularly because firms form multiple alliances to explore many different technical and market possibilities. Clearly, merging and then breaking up with several firms would be very expensive".[15]

14. In any case, managing a competitive-alliance or common R and D efforts is a relatively new art, and the development of alliance management skills is a great challenge to corporations. If, as is often said, collaboration or alliances are like "marriages", it is worth noting that it would be a mistake to consider the contract as an end in itself. Companies often concentrate mainly on the courtship phase, "rather than on planning how to live together on a day-to-day basis after the contract has been signed".[16] Consumating an R and D collaboration scheme is only the beginning: a well-balanced and structured contract will not ward off the failure of collaboration owing to poor or unenthusiastic management.

15. As indicated before, there is a great variety of R and D collaboration agreements between enterprises. Collaboration schemes could be directed to the development of generic technologies or of a specific novel product or process. Agreements can be concluded between enterprises of

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12 See A. Jacquemin, *Collusive Behaviour, R and D and European Competition Policy*, Discussion Paper IIM/IP 87-5, (Wissenschaftzentrum Berlin für Sozialforschung, 1987), p.20.

13 *Ibid*, p. 23.

14 See K. Ohmae, "The global logic of strategic alliances", Havard Business Review (March-April 1989), pp.149 and 150.

15 A. Mody, "Learning through alliances", *World Bank Paper* (Washington, D.C., 6 September 1999), pp. 11-12.

16 As a general rule of thumb, companies spend 90 per cent of their time structuring the alliances and only 10 per cent on human resource and management issues. See *Competitive Alliances: How to Succeed at Cross-Regional Collaboration* (New York, Business International Corporation, 1987), pp. 43,44 and 67.

equal or differing size or financial power. They may either focus exclusively on the development of a new product or include co-operation in the manufacture and/or licensing of the new product. Given the broad range of research co-operation forms that may take place among enterprises, it is convenient, for the purposes of this study, to adopt a simple and flexible definition.

16. The term R and D collaboration agreement or R and D joint venture will consequently be used interchangeably to encompass those agreements in which two or more companies provide a certain degree of technical collaboration or partial integration in research and development operations. Such a definition covers a wide range of R and D co-operation agreements between enterprises, which will be described below.

17. R and D agreements will be categorized according to the following criteria: (a) on the basis of the innovation process, an initial distinction will be drawn between "pre-competitive agreements" and "competitive agreements"; (b) a second category will be based on whether the collaborative research ventures are sponsored by governments or respond to the firms' strategies. Hence, a distinction will be made between R and D collaboration agreements carried out within the framework of R and D programmes sponsored by governments, and R and D co-operation agreements of a purely private nature, i.e. private ventures oriented to the production of a new technology or a new product which are financed neither by a co-operation organization nor by government agencies, and which do not respond to direct policy inducements, such as R and D programmes; (c) thirdly, according to the legal nature of the collaboration agreements, a broad distinction will be made between equity or corporate joint ventures and non-equity or contractual R and D joint ventures. The former category includes equity joint ventures involving the participation of two or more partners in the creation of a new corporate entity in which each partner owns a certain share of equity capital, or in the redistribution of the shares of an existing company among the parties. In a contractual or non-equity joint venture, partners co-operate as separate legal entities without setting up a new entity and carry out their respective contractual obligations in order to achieve the purposes set forth in the contract. In such cases, the internal legal relations between the parties co-ordinating or jointly undertaking research, on the one hand, and third parties, on the other, are regulated and organized on a contractual basis.[17]

18. Some remarks must be made with regard to these broad categories. First of all, it should be noted that the distinction between "pre-competitive" and "competitive agreements" may in certain aspects be misleading. As Chesnais argues "when firms get together to form a private R and D corporation producing proprietary generic technology for the parents in a joint-venture, these firms may not be doing "competitive R and D" from the perspective of their own joint venture relations. However, they are quite definitely doing "competitive R and D" from the standpoint of their relations with other firms in the industry".[18] Nevertheless, the distinction is not devoid of legal significance. It may serve to set forth the boundaries separating permissible and non-permissible government measures for the support of R and D from a competition policy perspective. The distinction is relevant, for instance, within the European Economic Community where governments may grant subsidies or incentives to enterprises or research centres as long as they are aimed at encouraging basic or pre-competitive research. State Aid cannot be directed to supporting product development at a competitive stage. Such actions may be regarded by the Commission as being inconsistent with the common market if they distort competition.[19] The relevance of this distinction is also to be seen with regard to the impact that competition laws may have on R and D ventures. antitrust regulation is usually stricter with regard to R and D agreements oriented to the development of a new marketable product. Conversely, competition rules

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[17] See the definitions contained in the document prepared for the thirtieth session of the Group of Experts on International Contract Practices in Industry in July 1987, "Guide on legal aspects of new forms of industrial co-operation: International joint ventures contracts" TRADE/GE.1/R.38/Add.1), Economic Commission for Europe; B. Dutoit, "Joint ventures and intellectual property 4 *IIC*, 1989; p. 44 ; and J. Caro Nieto, "Las llamadas 'joint ventures' como fórmula legal de colaboración entre el capital nacional y el capital extranjero", *Derecho Empresario*, IV.A (Buenos Aires, 1978), p.510.

[18] F. Chesnais, "Technical co-operation agreements between firms", in *in Science Technology Industry Review* (OECD, December 1988), p. 59.

[19] Member countries are required to notify the Commission of any State Aid for R and D. The Commission will, on a case-by case basis, determine whether public support is conceived for the creation of generic knowledge or is destined to favour R and D at a competitive stage. See general provisions on State Aid (Articles 92 and 93 of the Treaty of Rome), together with the Community Framework for State Aid for Research and Development, *Official Journal of the European Communities (EC Of. J.)*, 1986, C 83,2 "; A. Evans and S. Martin, "Socially acceptable distortion of competition: Community policy on state aid", *ELR*, April 1991, pp. 79-111; and "Interventions publiques et droit communautaire", under the direction of J.D. de la Rochère et J. Vandamme (Paris, Pedone, 1988).

have been relaxed by several States with respect to pre-competitive research as a means of indirectly inciting enterprises to engage in co-operative actions of that kind.[20]

19. It is also worth noting that the type of R and D (generic technology development or development of a new marketable product) may influence the structure of R and D collaboration agreements. Thus, the closer enterprises are to the production of generic knowledge, the easier it will be for them to negotiate an agreement encompassing several partners which may normally be competitors in certain markets. At pre-competitive stages, the flow of technological information among the parties may not be hampered by strict contractual restrictions or submitted to rigid control structures. In contrast, at competitive stages, co-operation to develop a new product among different companies is generally more difficult to organize and structure in a contract. In this context, the contractual form that collaboration may adopt will normally involve fewer participants.

20. One should bear in mind that it is on the basis of the distinction between pre-competitive and competitive research that both national and regional R and D programmes are built up. These programmes are normally conceived to support basic or pre-competitive research. The principle of subsidiarity is usually the underlying idea of any public-sponsored R and D initiative. At a pre-competitive stage, private enterprises would generally tend to under-invest in R and D unless some public support is granted. State support should, therefore, be present in those fields in which private companies would otherwise be unable or unwilling to carry out R and D efforts. Industrial inertia to invest in basic R and D could thus be overcome through State support. The differentiation between pre-competitive and competitive research should not, however, be overemphasized. It will suffice to note here that, for example, the wide-ranging scope of biotechnology (its techniques being relevant to industry, health care, agriculture, environment and energy) and the frequently close proximity of basic research to industrial application make the said distinction less transparent.[21] A similar ambiguity is to be observed in some EEC-sponsored R and D programmes like ESPRIT, RACE and BRITE under which several projects have direct industrial application. While requiring member States to confine State aid to basic or pre-competitive research, the Community itself does not seem to draw a clear-cut distinction between pre-competitive and applied research with respect to the R and D programmes it sponsors. A broad definition of pre-competitive research may therefore encompass several R and D projects with direct industrial applications. This allows several R and D projects with direct commercial applications to have access to substantial financing provided by the Community.[22]

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20 antitrust policy has little effect on pre-commercial research collaboration among United States firms in the wake of the National Cooperative Research Act of 1984. See D.C. Mowery and N. Rosenberg, *Technology and the pursuit of economic growth* (Cambridge, Cambridge University Press, 1989), p. 253.

21 OECD *Biotechnology and the Changing Role of Government* (Paris, 1988), pp. 15 and 39.

22 See H. Klodt, et al. *Forschungspolitik unter EG - Kontrolle* (Tübingen, J.C.B. Mohr, 1988), p. 100; and J.-B. de Boissière and B. Warusfel, *La nouvelle frontière de la technologie européenne* (France, Calmann-Lévy, 1991), p. 19.

Chapter II

BASIC FEATURES OF R AND D COLLABORATION AGREEMENTS

A. R and D collaboration agreements within public-sponsored programmes

21. These programmes constitute collective R and D undertakings on the basis of joint initiatives by governments and firms. Governments intervene, indicating key areas of research and granting financial support to encourage collaborative actions among research organizations, universities and private companies. The location and execution of R and D are not confined to university facilities but may be extended to other research institutions and the laboratories of private companies.

22. Government-sponsored domestic research collaboration among firms has been a significant element of Japanese industrial policy that has contributed to improving the technological level of certain industries. An important move towards the eencouragement of interfirm collaboration was made with the enactment of the 1961 Law on Research Co-operatives for Mining and Manufacturing Technologies. By virtue of this Act, private enterprises were able to form research associations to solve common technical problems, with or without government encouragement, in the form of loans and/or research contracts.[23] Such research associations supported by the State were particularly efficient in the 1960s and 1970s in adapting foreign technologies and creating a favourable predisposition among firms to collaborate in R and D activities. This research association scheme paved the way for the organization of government-sponsored co-operative research projects (mainly sponsored by the Ministry of International Trade and Industry, hereafter referred to as MITI) in the electronics and computer fields. Although the organization of government-financed co-operative research projects (usually known as Large-Scale Projects) may vary according to the sector involved and its objectives, they frequently share certain essential features:

- Collaboration is carried out through a careful division of labour between firms, industrial associations and national research institutions, organized through a unique research consortium;[24]
- Wide diffusion of knowledge takes place through special mechanisms. Thus, the results of these projects (patents, industrial property, etc.) are owned by MITI's Agency of Industrial Science and Technology (AIST) and diffused through the Japan Industrial Technology Association (JITA, a non-profit foundation), which has exclusive rights to license all industrial property and know-how. [25]
- Involvement of a large number of big firms in contractual research projects.[26]

23. Among the most notable examples, mention should be made of the Very Large-Scale Integration VLSI programme (1976-1980), which was intended to develop semi-conductor manufacturing technologies. In order to avoid granting subsidies to individual companies, MITI persuaded five large Japanese multinationals (Fujitsu, Hitachi, Toshiba, Mitsubishi Electric and NEC) to create a research co-operative. Almost 40 per cent of the research activities of the programme was financed by MITI, while the rest was funded by the five companies involved. The co-operative, which had its legal basis in the Research Co-operative Act mentioned above, was successful in developing basic technologies from which companies could benefit later in developing specific products.[27] This project served as a model for numerous foreign-initiatives like the Microelectronics and Computer Technology Corporation (MCC) and the Semi-conductor Research Corpo-

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23 Private corporations are responsible for the costs of the personnel working in the associations (which may include university researchers) and the government usually supports them by means of subsidies and tax incentives. See C.O. Phillips, *Innovation and Technology Transfer in Japan and Europe* (London, Routledge, 1989), p. 40; and Ph. Gugler, *Les alliances stratégiques transnationales* (Fribourg, Editions Universitaires, Fribourg, 1991), p. 276.

24 OECD, *Government policies and the diffusion of microelectronics* (Paris, 1989), p. 101.

25 *Ibid.*, p. 98.

26 *Ibid.*, p. 102.

27 Y. Ishiyama, "Industrial policies of Japan and the United States: Their mechanisms and international implications",

ration (SRC) in the United States. [28]

24. Another well-publicized initiative is the ICOT programme: (1982-1991), also known as the Fifth Generation Computer Project. This programme has been concerned with semi-conductors and the combination of artificial intelligence techniques with new parallel architectures. It is administered by MITI and carried out in ICOT (Institute for New Generation Computer Technology) a non-profit organization created in 1982. Research projects are also partly financed by MITI, which owns the rights to R and D results, patents and know-how and sells licences to private firms. [29]

25. The EEC has also undertaken a number of ambitious initiatives to encourage R and D collaboration, especially following the Single European Act which empowered the EEC to carry out a Common Research Policy. In this context, the EEC has already launched three Framework Programmes covering six key areas : Information and Telecommunications Technologies, Manufacturing Technologies, Environment, Biotechnology, Energy and Scientist-Mobility. Each of these areas is the subject of special R and D Programmes sponsored by the EEC and aimed at encouraging R and D collaboration to increase the competitiveness of European companies.

26. These special programmes rely on a few basic principles, namely:

(1) Collaboration projects must involve the participation of at least two independent industrial partners not all established in the same EC Member State.
(2) Projects are to be carried out by means of contracts to be concluded by the Commission with universities, research institutions or companies established within the Community. These contracts will normally govern the dissemination, protection and exploitation of research results.[30]
(3) Contractors will normally bear at least 50 per cent of the total expenditure on any project. The remaining portion is financed by the Community.[31]

27. The best-known EEC Programmes are ESPRIT (European Strategic Programme for Research and Development in Information Technology), RACE (R and D Programme in Advanced Communications Technologies for Europe) and BRITE (Specific R and D Programme in the field of Industrial Manufacturing Technologies and Advanced Materials Applications), among others. In national as well as in international R and D programmes, academic institutions and universities may be either equated to private companies[32] or possess a different and separate status. In the Alvey Programme (the British Telecommunications R and D Programme), the results of a project involving collaboration between academic contributors and private corporations were vested in the non-academic contributors who paid for any patent or like protection thought necessary. [33]

28. It should be noted that agreements concluded within the framework of public-sponsored R and D programmes are to be regarded in principle as pre-competitive agreements according to the criteria set forth above. These programmes are usually based on the principle of subsidiarity and conceived to create dynamic technological links and networks. R and D programmes are part of the industrial policies of governments and, at least theoretically, are not intended to subsidize product development but to speed up the emergence of new technologies. Consequently, in order to commercialize the results obtained through pre-competitive research, firms will usually have to make additional investments in R and D and eventually conclude additional R and D collaboration agreements of the kind discussed in chapter IV, e.g. co-operation agreements for the de-

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in *The US-Japanese Economic Relationship: Can It Be Improved?* K. Hayashi (ed.) (New York, New York University Press, 1989), p. 252.

28 See chapter II, section B below.

29 See OECD, *Information Computer Communications Policy: 20 Major R & D Programmes for Information Technology* (Paris, 1989), p. 124, and *Financial Times*, 8 September 1988, p. 10.

30 See BRITE/EURAM Programme in the field of industrial manufacturing technologies and advanced materials applications, Council Decision of 14 March 1989, Article 5 (3), *EC Of. J.* No. L98/18 (11 April 1989).

31 See RACE Programme in advanced communications technologies in Europe, Council Decision of 14 December 1987, *EC Of. J.*, No. L 16/35, 21 January 1988. See also ESPRIT Programme Council Decision of 11 April 1988; *EC Of. J.* No. L118/32, Article 3 (3), which emphasizes the duty of each contractor to make a significant contribution to projects bearing a substantial proportion of the costs, 50 per cent of which shall normally be borne by the Community.

32 In the ESPRIT Programme no separate status for academics is foreseen. Diffusion of technical knowledge and exchange of results will take place according to standard rules that will be discussed later.

33 OECD, *Information Computer Communications Policy: 20 Major R and D Programmes for Information Technology*, *op.cit.* p. 125.

velopment or commercialization of a new product, technology or process.

29. Nevertheless, one should bear in mind that the EC Framework Programmes are complemented by the EUREKA (European Research Co-ordination Agency) initiative which is oriented towards "close-to-the-market" projects with clear commercial applications.[34]

30. EUREKA projects are mainly concentrated on products, processes and services in high technology areas such as information and telecommunications, robotics, advanced materials, manufacturing, biotechnology and environmental protection, among others. The terms of the R and D collaboration are freely defined by the partners, the main condition being that projects associate at least two partners from two different countries. Public funds for EUREKA projects are allocated by national authorities exclusively to indigenous firms or laboratories.

31. The Commission has expanded the links between the Framework Programmes and EUREKA. In fact, it has for several years provided substantial funding and support to selected high-profile EUREKA projects (e.g. High Definition Television projects). The Commission has thus used EUREKA to fund collaborative R and D between large European firms "which was not clearly pre-competitive and could not be conducted easily under the Framework Programme because of conflicts with EC competition law".[35] This situation illustrates how a policy-mix may in fact blur the distinction between pre-competitive and competitive research. It is important to note that public-sponsored R and D programmes like ESPRIT, organized in sectors in which industry lags behind with respect to competitors of other regions, are partly aimed at improving reverse engineering tools and methods for competition purposes.[36]

32. In any case, one should bear in mind that the terms and the technology-sharing clauses in R and D collaboration agreements within the framework of public-sponsored initiatives may be influenced by certain public policy considerations, such as the diffusion of new information and technologies among a vast number of participants (e.g. research centres, firms).

B. Interfirm privately fostered R and D schemes at the pre-competitive stage

1. University-based co-operative research projects

33. These projects consist of collective R and D undertakings established and financed by firms in universities with or without public support. One of the distinctive characteristics of this type of agreement is the location of R and D in academic structures and the extensive support and direction given by firms, even if a certain amount of public support is offered. Despite some tensions that may arise between industry and university with regard to intellectual property rights, a close proximity to the university scientific community offers firms better access to knowledge that may be of great value in the market place.

34. Access to new sources of knowledge and the possibility of converting new knowledge into new and improved products before other competitors or potential competitors are always attractive for enterprises.[37] In the area of microelectronics, university/industry collaborative research organizations established in the United States correspond to this category. Thus, mention should be made of the Semi-conductor Research Corporation (SRC) composed of roughly 60 private firms

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[34] EUREKA does not constitute a legal person and is organized in the form of a diplomatic conference in which 19 European countries participate (i.e. the 12 EC Member States, 6 countries of the European Free Trade Association and Turkey)

[35] J. Peterson, "Technology policy in Europe: explaining the framework Programmes and EUREKA in theory and practice", *Journal of Common Market Studies*, vol. XXIX, No 3 (1991), p. 284.

[36] See A. Staines, "Copying and competition - Industrial aspects", paper presented at the Conference on Copying without infringing, held in London on 24 and 25 October 1991 at the CFS Conference Centre, and organized by ESC (European Study Conferences Limited).

[37] Mowery and Rosenberg, *op.cit.*, p. 260.

participating in the financing of research at a number of different universities. Another interesting example is the Stanford University Center for Integrated Systems (CIS), which is based in a single university, and where more than 20 companies participate in and finance R and D activities. Member firms in both organizations are granted access to all research findings and results through licences, briefings and so forth, and are often encouraged to send technical personnel to university research facilities for extended periods of time. It has been explained that "rather than developing applications for immediate transfer to industry, these programmes perform research, train technical personnel for industry and expose firm employees to advances in the scientific and technological frontiers". Collaborative schemes like the SRC do not appear to focus on tangible "deliverables" from research, rather, they operate as a "catch-up" mechanism for United States private industry, "enabling more rapid and effective utilization of advanced scientific and technological findings by participant firms".[38] University/industry collaborative research is also of growing significance in the field of biotechnology. It has been contended "that the close proximity of much fundamental biological research to industrial application, both in product and process development, has spawned a proliferation of industry/university research agreements which provide industry with a window on and rights to exploit research, and provide universities with additional sources of funding..."[39] These kinds of ventures are also increasingly taking place in newly industrialized countries (NICs) as well as in some developing countries. Thus, the Brazilian Government encourages university-based research involving co-operation between enterprises and between the latter and the academic sector by means of a plan launched in 1984 which is intended to foster the creation of technology parks.[40] Furthermore, university-based research in Argentina involving one university and private firms is successfully contributing to building up a team of experienced researchers and facilitating the technological upgrading of the petrochemical industry.[41]

2. *Research and development corporations*

35. They may be conceived as either (i) private corporate joint ventures financed by a number of firms on a shareholder basis or; (ii) as a research consortium involving regular fundings by private corporations and government agencies.

36. In the case of private joint ventures, research is carried out in separate laboratories or research facilities especially established for that purpose. They are normally composed of staff assigned by the joint-venture partners as well as staff specially hired. In both cases (i) and (ii) the research corporation acts as a research manager for the member companies and the programmes are generally conceived to supply "technology packages" or generic technologies that are, however, closely related to the commercial interest of the partners. The results of the research are proprietary and the joint-venture or research consortium activity while still "pre-competitive," i.e. not related to product or process development, has a clear commercial focus.[42] As examples of private corporate joint ventures, mention may be made in the area of microelectronics of the European Computer Research Centre (ICL, Bull and Siemens) and the Microelectronics and Computer Technology Corporation, a special research corporation created by 21 United States corporations (MCC).

37. The Biotechnology Research and Development Corporation (BRDC) designated to coordinate and manage research activities of federal academic and private sector laboratories in the United States is an interesting example falling in the second category.[43]

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38 *Ibid.*, p.267.

39 OECD, *Biotechnology and the Changing Role of Government*, *op.cit.*, p. 39.

40 Technology parks involving co-operative research between firms and research institutions already exist in the State of Rio de Janeiro in the fields of biotechnology and hign technologies. See E. White, "Politicas e instrumentos para el desarrollo de las nuevas tecnologias en América Latina", in *El derecho y las nuevas tecnologías* (Buenos Aires, Ediciones Depalma, 1990), p. 663.

41 This co-operative venture (Programa PLAPIQUI - PIDCOP Bahia Blanca) involving the academic sector and private companies started in 1977 and is being carried out in a research centre of the Universidad Nacional del Sur (UNS) set up in 1963. See F. Gatto, "Cambio tecnológico neofordista y reorganización productiva" in *Revolución tecnológica y reestructuración productiva: impactos y desafíos territoriales*, under the direction of F. Albuquerque Llorens et al (Buenos Aires, Grupo Editor Latinoamericano, 1990), pp. 88 and 89.

42 Chesnais, *op.cit.*, p. 60.

43 BRDC's founding in 1986 became possible owing to the enactment of the Technology Transfer Act of 1986 and the

38. It is composed of seven private equity members.[44] Its funding comes from three sources: (i) annual member company contributions, (ii) a State of Illinois research grant and (iii) a grant from the United States Department of Agriculture's Agricultural Research Service (ARS).

39. BRDC has concluded R and D agreements with ARS and several public universities in the State of Illinois. One of the particular features of such agreements is that co-ownership of all technology developed with BRDC funds is attributed to the corporation. Furthermore, it has the exclusive right to manage and administer the technology through licensing agreements. The revenues generated by these agreements are shared between BRDC and the institutional entity at which the technology was developed. Although member companies have first access to technology developed through the funded research, BRDC does have the opportunity to license to third parties.[45]

40. Another example worth mentioning is the Microelectronics and Computer Technology Corporation. This is yet another joint research project but is a completely private venture without any government involvement. The MCC was specially set up in 1982 by 21 United States firms competing in microelectronics and computer technology. It is organized on a shareholder basis. Membership is confined to United States companies. IBM and AT & T, which have their own R and D capabilities, are also excluded from the MCC.[46] Hence, it is clear that MCC was designed to increase the competitiveness of its member companies *vis-à-vis* the two largest United States companies with their own R and D facilities as well as in respect of European and Japanese initiatives in the field.

41. The purpose of MCC is to carry out and co-ordinate long-term research and development activities in microelectronics and computer development. It is not intended to engage in product development; rather its function is to supply "technology packages" to its members, who will then convert MCC research into commercial products and processes through further R and D in their own organizations.[47] MCC has the advantage of concentrating on "pre-competitive" research with a long-term perspective grouping private corporations that would otherwise be unable to face increasing R and D costs.

42. MCC has been organized into four research programmes encompassing the major concerns of the industry.[48] Members join one or more of these programmes and pay an equal share of the costs of each programme joined. It is worth noting that as MCC is a joint venture of specific scope, it does not imply the merging of the entire research activities of its members, which may carry out R and D individually outside the joint venture.

43. R and D costs are initially to be allotted on an equal basis. Participants who join the project later may be required to pay higher costs.

44. MCC owns all rights to results from its projects, and these are obtainable as of right by project participants on a royalty-free basis for an amount up to three times a participant's contribution to the funding of the project. Only project participants have the right to license technology in the first three years in which it is available. After three years, MCC shareholders who did not participate in the project, have a priority right to obtain licences at royalty rates set by the participants.[49]

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close co-operation of the United States Department of Agriculture's Agricultural Research Service (ARS) and the Biotechnology Center at the University of Illinois.

44 American Cyanamid Company, Arnoco Technology Company, The Dow Chemical Company ECOGON, Inc., Agricultural Research and Development Corporation, Hewlett-Packard Company and International Minerals & Chemical Corporation.

45 Until early 1990, BRDC had 38 projects, the funding of which was approved. Of these projects, 30 are very fundamental in nature. The remaining 8 have clearly defined product objectives that are attainable in three to five years. See *Technology Alliances for Competitiveness. A Review of Institutional Developments* (IC2 Institute, The University of Texas at Austin, 1990), p. 6.

46 Had IBM and AT & T joined the MCC, it would have raised antitrust problems since the joint venture would include the main United States competitors.

47 M.J. Peck, "Joint R and D: The case of the Microelectronics and Computer Technology Corporation", *Research Policy* vol. 15, No. 5 (1986), p. 220.

48 Semi-conductor packaging, VSLI computer-aided design, software technology and advanced computer architecture.

49 With the approval of the Board, technology packages may be licensed earlier by participants to other shareholders or non MCC members.

45. MCC has its own research facilities in Austin (Texas) and research is carried out by researchers specially hired by MCC as well as researchers belonging to each participating company.[50]

46. One of the virtues of these pre-competitive ventures is that they are oriented towards developing multiple intercompany links. This seems to be particularly true in the case of ESPRIT. Before the implementation of this initiative, enterprises tended to confine their activities to national markets. It is maintained that as a result of encouraging collaboration among enterprises, access to new markets became possible and important information-sharing networks could be created.[51] If the divulgation of information was facilitated through a scheme such as ESPRIT, this did not appear to be the case with other ventures. Thus, reliance by MCC on its own research staff has made technology transfer more difficult. It has been noted that "in contrast to university collaborative research operations, MCC cannot offer its members the attraction of recruiting graduates from the laboratory and transferring technology and know-how through this channel".[52] Conflicting strategies and research priorities among MCC members, together with their displeasure at the lengthy time-frame of MCC research activities, seemed to cause further problems.[53]

47. In any case, a successful diffusion of knowledge from these co-operative agreements requires personnel that actively link the individual company to the joint venture or research project. This principle is of particular importance to pre-competitive collaboration agreements but it is also relevant for collaborative ventures at all stages of the product cycle. However, the mere conclusion of an R and D collaboration contract is no guarantee that a diffusion of knowledge will occur.[54]

C. Interfirm privately fostered R and D schemes at the competitive stage

1. Agreements involving the use of corporate venture capital

48. These agreements are used by large firms to identify innovative processes within smaller organizations and to monitor the development of new technologies on the market. They imply the direct and continuous involvement of industrial firms in the financial activity of small innovative firms in order to obtain strategic benefits.[55] Large corporations may thus take advantage of the continuous flow of new technologies produced by small and medium-sized companies, while the latter are provided with the financial resources they lack. Collaboration in such cases may be structured through various interrelated contracts. Thus, a Stock Purchase Agreement between shareholders of the companies involved may govern the acquisition of a certain number of special or preferred shares by the large firm. Parties may agree that the acquisition of preferred shares issued by the small firm will not entail any right to control or manage the firm's activities. Such a provision prevents larger companies from interfering with the activities of small and innovative firms. The Stock Purchase Agreement is usually coupled with a technical agreement involving the granting of licences or cross-licences needed to acquire the necessary background, and the development agreement itself in which the partners set forth the principles governing the

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50 Most of the researchers are actually hired by MCC. See Peck, *op.cit*, p. 228. According to Peck, as of the beginning of 1986, 65 per cent of the researchers were directly hired by MCC.

51 L.K. Mytelka, "Les alliances stratégiques au sein du programme européen ESPRIT", *Economie Prospective Internationale*, No.37 (1989), p. 20. However, the same commentator noted that, despite the Commission's insistence on the pre-competitive character of the programme, more than 20 per cent of the projects had direct commercial applications in 1983. In 1986 more than 40 per cent of the projects were oriented to specific commercial applications. *Ibid*, p.17. See also J.- B. de Boissière and B. Warusfel, *op. cit.*, p. 19.

52 Mowery and Rosenberg, *op. cit*, p. 270.

53 *Ibid.*, p. 280.

54 See Mody, *op cit*, p. 25.

55 Chesnais, *op. cit.*, p. 60.

co-operation.[56]

2. Non-equity co-operative research contracts

49. Non-equity co-operative research agreements are a flexible form of co-operation in R and D activities without shareholder participation. This form of collaboration is used normally by a small number of firms to carry out specific research objectives. They are of limited duration, but, if R and D proves successful it can either be commercialized by each participating company or evolve into the establishment of a separate production and marketing corporate joint venture. As stated before, non-equity forms of R and D collaboration seem to be preferred in many cases to corporate or equity joint ventures. In the latter, emphasis on control of one partner over the other may discourage the creation of intercompany skills and a fluid exchange of information and knowledge. In addition, the high risks and uncertainty involved in R and D collaborative ventures are another reason why firms prefer to co-operate on a flexible basis.

3. Comprehensive R and D, manufacturing and marketing joint ventures involving the creation of a new legal entity by two or more companies

50. The development of a new product is, in this case, coupled with its joint marketing and production. Such agreements are less flexible and are to be found in the aerospace industry or telecommunication equipment, which are frequently characterized by heavy government involvement (as the owner of enterprises or aircraft or telecommunication equipment). These joint ventures are clearly 'market oriented'.

51. As stated earlier, joint 'corporate' ventures may also involve collaboration between a limited number of companies for the joint development, production and marketing of a new product. This is a more traditional form of co-operation which implies the creation of an autonomous business entity.

4. Technology-sharing agreements

52. Within the framework of such agreements, parties exchange their existing capabilities in order to develop a new product or range of products and/or to tackle jointly certain technical problems in a specific field. Such technology-sharing agreements bearing on "proven technologies" are frequent in the automobile industry, where one partner provides its engineering capabilities and the other its design expertise in order to develop a new range of vehicles. However, parties may go beyond co-operation in improving and combining existing capabilities: one partner may provide some original ideas or results arising from its own R and D work, while the other(s) may provide the complementary capabilities to develop the invention further on a marketable basis. In this context, technology exchange and sharing takes place very often by means of two-way exchanges of licences in areas that are directly complementary and partners tend to include clauses providing for the continuous exchange of improvements and new developments. Such co-operative schemes are frequent in fine chemicals and pharmaceuticals.

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[56] See, F. Lanfranchi, "L'utilizzo di techniche di venture capital per il finanziamiento di programme di innovazione tecnologica: un caso concreto", *Diritto del Commercio Internazionale*, January-June 1989 (3.1), p. 171.

5. Buyer-seller agreements

53. Such agreements are also characterized as vertical agreements as opposed to horizontal ones. The latter type of agreement involves R and D collaboration between competitors. Conversely, buyer-seller agreements are generally intended to co-ordinate complementary but not competing, or other similar activities of firms. The utility of customer-supplier co-operation "derives from an ability to safeguard relationship-specific investments and to facilitate adaptation to uncertainty".[57]

54. Buyer-seller technological co-operation can be implemented in the framework of any of the above-mentioned types of agreement. Such co-operation enables the supplier both to have a better picture of the market needs and to improve the quality of the product or service offered to customers. It has also the advantage of supplying customers with products or processes tailored to their specific needs (e.g. in terms of quality, quantities and delivery).[58]

55. Traditional relations between suppliers and customers are being partially replaced by collaborative R and D in those fields in which the diffusion of technological advances entails changes in the methods of organization and production of the user firms. This is actually a recent development that is taking place in relation to advanced materials (e.g. ceramics, composites, metal products) in which industrial applications are not possible without the mastery of various engineering techniques and intensive knowledge in different fields (e.g. in mathematics, physics, chemistry, statistics and data processing).[59]

56. Table 1 illustrates in a simplified manner the basic features of the different R and D co-operation agreements according to the categories mentioned above and gives examples of the agreements.

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[57] See J.B. Heide and G. John, "Alliances in industrial purchasing: the determinants of joint action in buyer-supplier relationship", *Journal of Marketing Research*, vol. XXVIII (1990), p. 4.

[58] See Ph. Gugler, *Les alliances stratégiques transnationales*, *op cit*, p. 187.

[59] See OECD study on "Advanced materials: Policies and technological challenges", (Paris 1990), p. 54. Technological co-operation between seller and buyers is also frequent in the aerospace industry as well as in robotics.

Table 1

Types of interfirm R and D collaboration agreements

Pre-competitive stage	1. R and D collaboration agreements in the framework of public-sponsored R and D programmes	2. Interfirm privately fostered R and D
Types and examples	EUREKA, COST, Community Framework Programmes (ESPRIT, BRITE, RACE), national R and D programmes (Alvey in the United Kingdom, MP in Germany, PAPE in France, etc.)	(a) University-based R and D collaboration agreements: Semiconductor Research Corporation (SRC), Stanford University Center for Integrated Systems (CIS) (b) Research and Development Corporation: Microelectronics and Computer Technology Corporation (MCC)
Basic features	May easily involve more than two actual or potential competitors Vast diffusion of information and technologies is likely to occur	Idem A relatively vast dissusion of information and generic technologies is likely to occur among participants and members of the research corporation
State involvement	State may (or may not) point out certain priority areas Public financing for the project (besides other policy inducements) Enactment of basic rules or guidelines to ensure a vast exchange of information and results and to facilitate the creation of dynamic technological links between enterprises and between the latter and academic centres State or sponsoring agency may become party to an R and D contract. State party or agency may be entitled to seek protection for inventions if participants fail, or are unable, to do so.	State may provide loan facilities, tax deductions, installations and even financing for the creation of facilities or acquisition of equipment to be used in R and D collaboration projects

Table 1, concluded

Types of interfirm R and D collaboration agreements

Competitive stage	1. R and D public-sponsored programmes	2. Interfirm privately fostered R and D
Types and examples		Basic legal forms: (a) Corporate joint ventures (b) Contractual joint ventures ▶ Legal form of the agreement will depend on the position of the partners in the market and governmental regulations.
Basic features	R and D programmes are generally conceived to enhance competitiveness in specific sectors; they are not conceived to support product development. However, through a broad definition of pre-competitive research, projects directed to product development or having direct commercial applications are likely to be included (e.g., ESPRIT, RACE, etc.)	Great variety of possible agreements, ranging from flexible non-equity agreements to rigid agreements where exchange and use of information/results are subject to the control of special committees composed of the partners. Restrictive clauses to ensure the success of the R and D activities are likely to be included in the agreement (e.g., ban on independent research related to the field of the cooperation agreement, duty not to transmit background and foreground information and results to third parties, etc.)

Chapter III

TECHNOLOGY-SHARING AT A PRE-COMPETITIVE STAGE: THE CASE OF THE MCC AND THE ALVEY AND ESPRIT PROGRAMMES

57. National and international R and D programmes respond to differing motivations and pursue diverse goals. However, one reason for collaborative research often asserted in Europe is that the European firms are either not large enough or not sufficiently integrated to meet effectively the competitive threat posed by Japan and the United States in certain fields. Similar arguments have been frequently used in the United States to incite small and medium-sized firms to engage in collaborative research. This is particularly true of some co-operative R and D programmes or ventures such as the Microelectronics and Computer Technology Corporation (MCC), a private research corporation in the United States, the Alvey Programme (information technologies)[60] in the United Kingdom and ESPRIT (the European Strategic Programme for Research and Development in Information Technology), in which such reasons have been invoked as calling for collaborative action.

58. In this chapter, a comparison will be made of technology-sharing principles governing R and D collaboration within the above-mentioned joint schemes. The analysis will be focused on these three frameworks for the following reasons: first, they are centred on pre-competitive research; secondly, they involve joint research in the same sector, i.e. information technologies; and thirdly, each of these schemes represents a different approach to encourage R and D collaboration. The Alvey Programme is a government-sponsored R and D programme mainly designed to improve the competitiveness of the industry within the United Kingdom. ESPRIT constitutes a special programme launched by a regional integration body (the EC) and mainly pursues the creation of technological linkages and the enhancement of industrial competitiveness on the regional plane. Finally, the MCC is an entirely private research corporation created by a group of United States firms faced with increasing competition from the biggest among them (IBM, AT&T) as well as from Japanese and European corporations. In contrast, the next chapter will chiefly deal with technology-sharing mechanisms within the framework of interfirm R and D collaboration at a competitive stage, i.e. R and D with direct industrial applications and oriented to the industrial production and/or commercialization of the research results.

59. Growing policy concern with respect to joint R and D activities among enterprises and between the latter and universities, as well as the growing trend for multidisciplinary research in certain areas, involve the question of the joint proprietary rights of the inventors and innovators.[61] The process of innovation and commercialization of technology "is all along characterized by the interplay of intellectual property rights from the inventive activity to the stage of commercialization. The significance of intellectual property rights is demonstrated by the fact that any transaction for technology collaboration/transfer is, in fact, a transaction in these rights."[62] Therefore, in order to protect the proprietary rights of the participants to a joint research project on the one hand, and to facilitate the diffusion of new skills among a vast number of actors on the other, governmental or private inititiatives concerning joint R and D at a pre-competitive stage tend to strike a balance between the protection of inventions and the divulgation of new knowledge.

60. This balance is somehow reflected to a certain extent in a set of basic rules aimed at bringing about an effective sharing of information and knowledge among enterprises and research institutes while ensuring the protection of the results. Accordingly, participants in R and D projects within these frameworks are not entirely free to determine the conditions for the enjoyment of IPRs. It may be of interest, therefore, to have a comparative picture of these rules in the three frameworks mentioned above.

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60 The successor framework to the Alvey Programme, which ended in 1988, is likely to put more emphasis on collaborative long-term research programmes. See OECD, *20 Major R & D Programmes for Information Technology*, *op.cit*

61 K. Singh, "Technology innovation and evolving regime of intellectual property rights - Perspective for developing countries", *Journal of Scientific and Industrial Research*, 50 (1991), p. 154.

62 *Ibid.*

61. The MCC (being a private research corporation) owns all rights to the results from its projects. Participants receive a royalty-free licence from MCC for an amount up to three times their contribution to the funding of the project. Licences are confined to participants for the first three years after the termination of a project, priority being given thereafter to other MCC share-holders. The system is summarized in table 2 below.

Table 2

UNITED STATES: IPR RULES IN THE MCC

(1) All participants in a programme pay equal shares (except those who pay at a higher latecomers' rate);

(2) The results are transferred to participants by licence from the MCC;

(3) Participants receive a royalty-free licence for an amount up to three times their contributions;

(4) Cash royalties are divided as follows:

- 3 per cent to the MCC;
- 5 per cent to programme researchers;
- 28 per cent to participants credited against MCC programme membership;
- 64 per cent to participants in equal shares;

(5) Licences are restricted to participants for the first three years, then priority is given to other MCC share-holders.

Source: : OECD, *Information Computer Communication Policy: 20 Major R and D Programmes for Information Technology* (Paris, 1989), p. 125.

62. In the Alvey as well as the ESPRIT programmes, some basic rules concerning IPRs have to be taken into account by participants. These rules are intended to ensure the transfer of information and new knowledge.

63. Both the Alvey and the ESPRIT Programmes differentiate between "foreground" and "background" IPRs. "Foreground" information includes all technical information, inventories, designs and IPRs generated in the course of a project. "Background" includes any designs, computer software, reports, inventories and IPRs that are made available by a contributor for use in a project but belong to a participant. However, in the Alvey Programme participants enjoy considerable freedom to define matters related to IPRs in their contracts, being only required to observe a few rules intended to facilitate the sharing and transmission of information. In the framework of Community Programmes (such as ESPRIT), participants carry out collaborative ventures instead, in accordance with the conditions set forth in the so-called Model Contract which contains detailed rules on IPRs and information sharing.[63] In practice, the Model Contract might prove insufficient so some enterprises conclude additional agreements including provisions dealing with matters of liability and exploitation.

64. Participation in Alvey and ESPRIT does not affect the ownership of background IPRs.

[63] The Model Contract (Annex II, General Conditions) contains detailed rules on ownership and exploitation of background and foreground innovation and information or knowledge. The Model Contract is one of the policy instruments used by the Community to ensure wide diffusion among enterprises of the information and knowledge resulting from the R and D programmes it sponsors.

Furthermore, in both Programmes, background information and IPRs are freely available to the participants in a project to the extent necessary to carry out research under the contract.[64] Foreground IPRs or information are also freely available among the participants in joint R and D projects as far as is necessary to carry out their R and D agreements under Alvey and ESPRIT Programmes. However, differences emerge between these two Programmes with regard to transmission or divulgation of background and foreground information and results to non-participants.

65. In ESPRIT, companies or research institutions established in the Community have access to and may be granted a licence in respect to background and foregound information and IPRs as long as these are needed to carry out research under other R and D contracts within ESPRIT's framework or under any other specific Community R and D programme and provided that no major business interest of the Contractor precludes this.[65]

66. As regards Alvey, access by other Alvey Club members or Category Club members outside the research consortium to the results of the research seems to depend on the contributors to the particular R and D projects. Some degree of diffusion takes place, however, by means of reports made available to Category Club members.[66]

67. Table 3 below illustrates the similarities and differences between Alvey and ESPRIT with regard to availability of information and IPRs to be used by participants and non-participants for research purposes.

68. As far as the exploitation of results is concerned, it is also of interest to compare their distribution in the framework of the MCC, ESPRIT and Alvey.

69. Firstly, the principle of sharing information and knowledge beyond the specific scope of a given R and D contract or project forms part of the three examples mentioned above. In other words, it is clear that the benefits of the results are not confined to the partners in a specific R and D project.

70. However, there are important differences with regard to the modalities and mechanisms for transferring or transmitting the results of a given R and D project to other non-participating entities linked to the institutional framework in which the research has been done.

71. In the MCC more emphasis seems to be put on the need for granting a special advantage to the entities participating in the R and D project. Thus, only participants are entitled to license technology in the first three years in which it is available. Even more than the royalty-free rights, up to three years' head start is the significant benefit from programme participation.[67] It is only after these three years that MCC shareholders who have not participated in a particular technology programme have the right to obtain a licence. Furthermore, the royalty rates are set by the participants. Indeed, the long-term interests of the research corporation prevail in the distribution of the licensing income which is intended to ensure the pursuance of further research work by the shareholders.

72. By contrast, in ESPRIT, the wide divulgation of knowledge and information is particularly stressed. In principle, there is no such thing as an exclusive right for "innovators", i.e. the participants directly involved in a research project. Contractors are required to grant royalty-free licences and user-rights for any patent or information generated under the R and D contract to the other contractors as shown in table 3. In addition, they are required not to "unreasonably" refuse to grant user-rights and non-exclusive licences to:

- Other contractors participating in other projects within the ESPRIT Programme that are Community Undertakings or non-Community Undertakings;

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64 Different terminology is used in the Programmes to refer to the participants in a common R and D project or contract. In Alvey a *Contributor* is any firm, academic or other research organization in receipt of financial support from the Alvey Directorate (the sponsoring agency). A group of contributors bound by a collaboration agreement forms a *Consortium*.

65 In the framework of Community Programmes, Community Undertaking means any person or legal entity established or incorporated in the EC and carrying out R and D in the Community. Non-Community Undertaking means any person or legal entity established or incorporated outside the Community but engaged in a Community R and D Programme (by authorization of the Council, or by being so entitled under a Framework Agreement).

66 The *Category Club* consists of contributors working in an Alvey project. The *Alvey Club* is composed of all members of the Category Clubs.

67 M.J. Peck, "Joint R and D ...", *op. cit* p. 228.

Table 3

Intellectual property rights in the ALVEY and ESPRIT Programmes: Availability of IPRs for R and D purposes

	ALVEY	ESPRIT
Background information and IPRs		
Among participants	Background necessary for the purposes of the project shall be freely available within each Consortium.	Contractors shall, upon request and on non-discriminatory transfer conditions (i.e. conditions that have a value lower than commercial conditions covering normally only the cost of making the licences available), grant non-exclusive licences to other contractors to the extent necessary for their own R and D tasks.
Others eligible	Outside the consortium: Members of the Category Club or Alvey Club. A Confidentiality Agreement may be required if commercial information has to be disclosed.	Other contractors which are Community Undertakings: access to background information, non-exclusive licence for background patents on favourable conditions (i.e. on more favourable conditions than those prevailing in the market), provided they are necessary for R and D purposes within the framework of a Community R and D programme. Non-Community Undertakings: access to background information, non-exclusive licences on favourable conditions for background patents provided they are necessary to carry out research within the framework of ESPRIT.
Foreground information and IPRs		
Among participants	Information freely available within each Consortium for the purposes and duration of that project.	Royalty-free where and to the extent needed or useful for the execution of their research work. Non-exclusive licence for foreground patents.
Others eligible	Regular reports describing progress and results for dissemination confined to the appropriate Category Club(s). If commercial information is to be transmitted to anyone not collaborating in the project, agreement by all the contributors to the Consortium may be required to determine the conditions of disclosure.	Contractors participating in other projects within ESPRIT: Non-exclusive licence for foreground patents on transfer conditions (Community as well as non-Community Undertakings) to the extent needed to carry out a research contract with the EEC. Community Undertakings participating in other Community Special R and D Programmes: Non-exclusive licence on transfer conditions to the extent necessary to carry out the research contract with the EEC. Other Community Undertakings not engaged in EEC research and development programmes: Non-exclusive licence on favourable conditions for foreground patent to the extent that they are necessary to carry out research in related fields, in conformity with information or grant licence if it has taken adequate steps to exploit or commercialize the information or patents in the Community.

Source: : Based on the *EC Model Contract - Annex II*, and OECD, "Information Computer Communication Policy :..., *op.cit*, p. 129.

- Other Community Undertakings participating in any other special Community R and D Programme;
- Other Community Undertakings not carrying out research within any Community R and D Programme if the rights or licences are necessary for the exploitation or commercialization of their own R and D work in the same or related fields;[68]
- Any other legal entity established or incorporated in the Community which has a legitimate interest in the rights or licences for manufacture, commercialization, use, exploitation and so on. In such cases, these entities have access to the new technologies only if the contractor, or any of its licensees, has not taken adequate steps to exploit or commercialize, or to secure exploitation or commercialization.

73. These licences or user rights are granted on favourable conditions,[69] and are necessary for the requesting company to exploit or commercialize the results generated in its own R and D work. However, there are certain limits to the diffusion and transfer of new technologies: other Community Undertakings not carrying out specific R and D projects may only have access to the results if the business interests of the owners are not affected and if no steps for their commercial exploitation have been undertaken by the contractors or its licensees.[70] This provision establishes a limit to the rights of other Community Undertakings to benefit from the wide diffusion of knowledge and information arising from R and D collaborative ventures carried out within the framework of Community R and D Programmes. It acknowledges the difference between pre-competitive research and commercial development. At a pre-competitive stage, private companies may use, for the exploitation of the results of their own research, knowledge and information arising from R and D contracts to which they are not parties. This is possible because the results obtained at a pre-competitive stage presuppose additional investments and further R and D in order to convert new ideas or processes into marketable products. In contrast, third parties -- even if they are Community Undertakings -- may be prevented from making use of the results or new knowledge if they relate to processes or products which are, or are about to become, commercially available. It should be noted that, according to the definition of a Community Undertaking in the Model Contract, foreign subsidiaries incorporated in one EC Member State and carrying out research in the Community may participate in Community R and D programmes and benefit from the diffusion of technological knowledge taking place within such schemes.[71] Nevertheless, in practice, the precise definition of what constitutes a Community Undertaking is not always entirely clear. A case in point is the exclusion of the United Kingdom-based ICL Corporation from some EC-sponsored R and D programmes. The exclusion took place after the acquisition of 80 per cent of ICL's shares by a Japanese firm (Fujitsu).[72]

74. The Alvey Programme's framework is closer to ESPRIT's conception than to that of the MCC. However, the EC standard rules (Model Contract, Annex II) provide for a wider transfer of knowledge and information originating from the R and D contracts to non-participating entities. Thus, in the case of the Alvey Programme, Club members (all other members participating in other Alvey projects) may have access to the foreground information and patents through a licence granted on commercial terms and not under more favourable conditions, as is the case in the framework of ESPRIT, with regard to undertakings participating in other Community Programmes. Table 4 shows in a summarized form the differences between Alvey and ESPRIT with respect to the exploitation of results.[73]

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68 In addition, the Community is also entitled to obtain a royalty-free irrevocable licence to use the foreground information or foreground patents for research purposes.

69 Conditions that have a lower value than open market payment conditions.

70 Model Contract, Annex II, General Conditions, Article 17.3.

71 non-Community Undertakings, e.g. companies established and conducting research outside the EC are not entitled to participate in EC-sponsored R and D unless a special authorization is given by the Council of the EC or a framework co-operation agreement concluded between the EC and a non-EC Member State allows the Undertaking to take part in the R and D programmes. So far, no such framework agreement has been concluded with developing countries.

72 In any event, the scope of the definition of a Community Undertaking contained in the Model Contract has been apparently narrowed by the decision of the EC research ministers authorizing the participation of foreign-owned enterprises in EC research programmes on a case-by-case basis. As reported in *Business International*, 1 July 1991, p. 218, "research ministers noted that a company is considered to be established in the EC if decision making takes place in Europe, the research is carried out in Community-based laboratories and EC intellectual property protection standards are respected".

73 Unlike the three initiatives discussed in this section, in the Japanese *Fifth Generation Computer Project* (ICOT Programme), the Japanese Government holds all the results and sells licences to private companies (see chapter II, A).

Table 4

Exploitation of results (IPRs)

ALVEY		ESPRIT
Results vested in non-academic partners in return for royalties	Academics	No separate status for academics
Foreground available to partners (if necessary to exploit their results) on "fair and reasonable" terms	Foreground to partners for exploitation	Foreground available to partners on royalty-free basis
Club members entitled to "request" licence to use foreground on commercial terms if necessary to exploit own results	Foreground to other participants for exploitation	All participants entitled to a non-exclusive royalty-free licence foreground unless conflict with major business interest of the owner. Any other Community Undertaking carrying out an R and D project within a Community R and D programme or having legitimate interests may be granted a non-exclusive licence.
Licence to partners if necessary to exploit own results	Background for exploitation	Licence to partners only to the extent necessary to carry out R and D projects under a Community R and D Programme and unless this would conflict with the major business interest of the owner.
Results offered first to partners, then Club members, then to any other participant	Failure to exploit	Results may be offered to any Community Undertaking unless this would conflict with the major business interest of the owner. The Community may apply for legal protection if the participant is unable or unwilling to do so.

Source: Community Model Contract, annex II (General Conditions) and OECD, "Information Computer Communications Policy: ...", *op. cit*, p. 125.

75. As compared to ESPRIT, more emphasis is put in the Alvey Programme on the preservation of the commercial interests of the innovations for the parties to an R and D agreement rather than on the provision concerning the widespread diffusion of new technology or information. It should be noted that companies parties to an R and D venture are sometimes reluctant to transfer foreground knowledge developed by them to third parties. This is particularly true when the results of the joint research embody substantial background knowledge provided by the co-operation partners. Since the splitting of foreground and background knowledge may become impossible, companies are likely to refrain from providing strategic background to collaborative ventures in the framework of Community R and D programmes. In other words, the fact that firms are required to transfer foreground information (incorporating their background knowledge) to third parties may cause firms to concentrate research on issues of secondary importance and to participate in the programmes mainly to collect additional fundings.[74]

[74] I. J. Carbonell, "Managing intellectual property rights and joint R & D Agreements". Paper presented at the Conference on Intellectual Property Rights in European Collaborative Research and Training, held at Manchester on 25 and 26 April 1991 and sponsored by the EEC (Sprint Programme).

Chapter IV

INTERFIRM R AND D COLLABORATION AGREEMENTS AT THE COMPETITIVE STAGE: MAIN ELEMENTS

76. In this chapter, the main elements and basic issues related to R and D collaboration agreements between enterprises concluded outside the framework of public-sponsored R and D programmes will be discussed. The analysis will centre on agreements of this kind that are oriented to the development of a new product or process at a competitive stage.

77. R and D collaboration agreements involve the exchange of background and foreground information and knowledge that may have a substantial impact on the competitive positions of firms. The definition of technical terms -- such as technology, background information or knowledge, joint inventions or inventions independently made by one partner -- is of significance in interpreting other provisions of the contract, namely the rights to be allocated to the parties deriving from joint inventions or co-operation duties related to the maintenance or defence of IPRs derived from joint inventions. In the absence of any precise contractual definition, if a dispute arises between co-operation partners or between the latter and third parties, courts or arbitration tribunals will tend to derive the meaning and scope of expressions such as "joint invention" from the proper law of the contract or from those laws that are more closely connected to the contract. The latter possibility may be avoided if partners take advantage of the generally accepted principle of the contractual freedom of the parties which enables them to adopt any solution that corresponds to their particular conditions or interests. However, despite this freedom, parties to an R and D collaboration agreement may not escape from the application of certain mandatory rules. For instance, if partners decide to organize common research teams and hire special experts for certain research purposes, they should bear in mind that contractual regulation may not always replace labour law which regulates employment conditions and is regarded as mandatory under many legal systems. The same can be said with respect to product liability, consumer protection and competition laws.

78. Another contractual element of the utmost importance is to define which and to what extent background technologies and foreground results are to be shared and used for research or commercial exploitation purposes by the co-operation partners. In this connection, parties must set up a co-operation framework which enables them to exchange information and results while preventing any knowledge brought to the venture from being disclosed or used by unauthorized third parties.

79. The object of R and D collaboration among private firms may be either to create a new product, process or range of products or to find new applications for an existing product or technology. The elaboration of a new product or process in the framework of interfirm collaboration agreements does not always involve co-operation in research during the entire process of R and D to commercialization. Thus, a given company, while having discovered a new process, may not be capable of producing it independently on a marketable scale. Such a company may, therefore, seek to enter into a collaboration agreement with another possessing the complementary capabilities needed to further develop and market the new process.[75] Indeed, in other cases, partners need to co-operate during the whole process of R and D to commercialization and even beyond that, i.e. in the marketing of the new product.[76]

80. It is worthwhile noting that companies frequently couple co-ordination or co-operation in

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[75] For instance, BP International Ltd. (BP) discovered in the course of its R and D work catalysts for refining oil that were useful for the production of ammonia, but which could not be used commercially until incorporated into an appropriate process. As BP did not have the necessary experience in the design, construction or commercial exploitation of designs for such a process, it found a suitable partner in M. W. Kellog, a large plant designer and contractor. They decided to conclude an agreement for the joint development of a design for the construction of an ammonia plant using BP's catalyst. See the description of the agreement in *EC Of.* No. L369/6, December 1985.

[76] This is the case of market segments, such as space telecommunications, where the particular nature of demand results in each product, e.g. satellites, being a unique project which requires newly developed or highly adapted components assembled to an individual design dependent on the particular needs of the customer. Customers' concerns may cause parties to insist on a very high degree of collaboration for the development of the product from an early stage. See, for instance, the Alcatel Espace/ANT Nachrichten-technik Agreement which provides for co-operation in R and D as well as in marketing, *EC. Of J.*, L32/22, 3 February 1990.

research with collaboration in either production, licensing, distribution or even marketing. Due to the relaxation of antitrust regulations taking place in several industrialized countries in order to encourage innovative ventures, contract drafters could feel tempted to include R and D provisions in order to fall within the scope of antitrust exemptions (as discussed below). Very often partners carrying out common R and D work consider that a certain degree of collaboration --at least for a time-- in other matters such as manufacturing or distribution may be necessary for the successful commercialization of the research results. Besides the complex questions underlying the implementation of a joint research programme, partners must tackle the difficult task of allocating the intellectual property rights that may result from the research work. The increasing importance of intellectual property rights as a business asset frequently requires parties to define questions related to the ownership, protection and exploitation of the intellectual property rights.

81. In sum, once the preliminary clauses are drafted (i.e. general principles on which co-operation must rely, definition of technical terms and object), the two most important matters to define are (i) how the research work will be implemented and (ii) who will own the results and how partners will exploit them. These topics will be discussed in sections A and B below.

A. Organization and implementation of collaboration

1. General remarks

82. Normally parties define the contribution of each participant to the R and D work as well as the allocation of tasks in the contract in broad terms. Technical details are normally included in technical annexes to the contract. In such annexes, the programme of work is specified and the contribution of each participant is further detailed. In addition, reference is frequently made in the annexes to the timetable according to which the working programme must be accomplished. The essential benchmarks for each party in every stage of the common project may also be included. Timetables may be binding or merely indicative. In the former case, failure of one of the partners to comply with it could entail the application of specific penalties foreseen in the contract.

83. Contributions may include personnel, facilities, material and equipment, among other things. The responsability of each party in the implementation of the research co-operation is also defined.

2. Working methods

84. The selection of working methods to achieve the objectives of the agreement may depend on the nature of the market, the position of the partners in the relevant markets and their respective appropriability concerns. Thus, in certain fields the most technologically valuable portions of a joint project may often be concentrated in a few components, the manufacture and testing of which must be allocated among partners. In this context, an equitable allocation of contributions among participants usually entails a complex bargaining process and may lead to the establishment of rigid organizational structures, with the partners' tasks as well as the exchange of information and results among parties being supervised by regular meetings of executives of the parties or by special committees composed of representatives from the participating companies. In addition, in a horizontal R and D alliance where parties are or may become competitors, a reluctance to transfer core technologies to the other parties on the one hand, and an interest in increasing technological capabilities through an R and D collaboration agreement on the other, also influence the selection of the working method. Partners devote considerable attention to devising technology transfer schemes to protect their respective competitive advantages, but also to have access to new and complementary knowledge which is in the possession of the other party/parties and may be necessary for the development of a new product or process. In view of the above-mentioned factors, companies willing to engage in R and D collaborative ventures may resort to differing

working methods, which may include the following:

(a) Creation of a new legal entity or a common business entity

85. Parties may consider it appropriate to create a new and separate legal entity to be commonly owned and managed by the parties. In this case, collaboration in R and D is implemented through various agreements. First, parties conclude a basic agreement whereby they create the new entity and specify its functions and its relation with the parents. This framework agreement normally contains basic principles concerning the transfer of knowledge and information by the parent companies to the corporate joint venture, which will be trusted with the elaboration or adaptation of a new technology or product. However, the modalities of the transfer of background knowledge and intellectual property rights by the parents to the new entity are spelt out in more detail in separate licensing or technical agreements concluded between each of the parents and the corporate joint venture. In order to ensure the success of the joint venture, parties generally grant the new entity an exclusive licence enabling it to make use of the technologies and IPRs that may be required to accomplish the object of the co-operation agreement. In addition, parties normally commit themselves not to compete with the corporate joint venture in the field of the R and D agreement. Hence, they are prevented from carrying out with third parties any joint R and D within the scope of the collaboration agreement and during the execution of the R and D project.

86. It should be noted that the new entity may be created to carry out a specific R and D project limited in scope and time, or it may be conceived as a research corporation established by competitors with a view to creating and eventually producing a new range of products. Mention may be made, for example, of the Henkel/Colgate agreement. Both firms are large manufacturers of detergents operating on a world-wide scale. The two companies decided to set up a joint subsidiary entrusted with the task of carrying out research relating to detergents. The corporate joint venture was not only entitled to undertake the research work commissioned by the parents but could also carry out R and D work on its own intiative. Under the agreement, the two parties had access to the results of the joint R and D on the same conditions and were permitted to use them without limitation. The agreement did not proscribe either party from carrying out individual research, but provided that each party would make available to the joint subsidiary the results of such research work.[77]

87. Alternatively, instead of establishing a traditional corporate joint venture, partners may take advantage of certain national and regional regulations that set out flexible frameworks in which parties may organize co-operative actions. An interesting example of such a framework is the EC Regulation on the European Economic Interest Grouping (EEIG), which was adopted in 1985 and entered into force in July 1989.[78] This regulation establishes a new form of commercial legal entity within the EC and embodies rules for its formation and operation. The EEIG is intended to be a transnational entity through which its members can co-operate and take joint action to their mutual advantage.[79] It is interesting to note that the regulation gives the contractual arrangement itself the status of a separate legal entity (the EEIG), and protects it as such.[80] The main purpose of an EEIG "shall be to facilitate or develop the economic activities of its members and to improve or increase the results of those activities; its purpose is not to make profits for itself". Moreover, "its activity shall be related to the economic activities of its members and must not be more than ancillary to those activities".[81] This regulation thus provides firms with a flexible framework for pooling some business functions, such as R and D, while retaining their economic and legal independence. The co-operation implemented is carried out by the EEIG through two organs: the members acting collectively and the manager acting on behalf of the EEIG before third parties. The transnational nature of the EEIG is reflected in its composition: all EEIG members cannot be from the same EC Member State.[82] The EEIG model was mainly inspired by a French business

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77 See the description of the agreement in *EC Of. J* No. L14/14, 23 December 1971.

78 Council Regulation on the European Economic Interest Grouping (EEIG) No. 2137/85, *EC Of. J.*, No. L199, 1985.

79 D. Murphy, "The European Economic Interest Group (EEIG): A new European business entity", *Vanderbilt Journal of Transnational Law*, 23 (1990), p. 68.

80 See EC Regulation No. 2137/85, Article 1 (2)

81 *Ibid*, Article 3 (1)

82 Companies must be incorporated and have their administrative centre in one of the EC Member States. Therefore, a subsidiary of a Japanese or United States parent that is incorporated and has its central administration in an EC country would qualify as a member of an EEIG. See EC Regulation 2137/85, Article 4 (a).

grouping, the "Groupement d'intérêt économique" (GIE), which was introduced into French law in 1967.[83] A similar scheme exists in Italy and in some developing countries.[84] The advantages of such a collaboration framework are twofold. First, it is likely to meet antitrust legislation requirements, since these regulations are structured in such a manner as to preserve the independence of partners and principally foster co-operation among small and medium-sized enterprises. Secondly, some tax difficulties related to corporate joint ventures are removed since the profits or losses resulting from the activities of such groupings are taxable only in the hands of the members.[85]

(b) Exchange of information and results

88. Exchange of information and of the results of the R and D activities is one of the key elements of R and D collaborative agreements. In many instances, partners who are or may become competitors prefer to undertake the research work individually in their own facilities. Exchange of information and results therefore constitutes an element of the utmost importance for rationalizing R and D work as well as reducing its cost and avoiding duplication of effort. The same could be said of co-operative R and D carried out by a separate legal entity. A certain flow of information and knowledge in possession of the partners is generally needed by the joint venture in order to accomplish its own R and D successfully. The importance of the exchange of information and knowledge during the life of the collaboration agreements deserves further consideration and will be described in the sections below.

(c) Specialization

89. When R and D is carried out separately by each partner in its own facilities, the need to avoid duplicative research work may lead to a certain degree of specialization by the partners. Thus, parties frequently agree to assemble separately specific components or parts of a new range of products to be exchanged for the components manufactured by the other partners. In other words, the joint range is to be assembled by the parties in their respective facilities, with each partner supplying the other with the sub-assemblies, components or parts for whose manufacture or procurement he is responsible.[86] In this context, parties usually further restrict each other's freedom to ensure the success of the venture by requiring that only sub-assemblies, components and parts manufactured or procured by the party responsible for the item in question may be used for the production of the joint range. This rationalization of the manufacturing process may also imply a certain degree of standardization to facilitate the mutual exchange of components and results during the life of the agreement or even after its expiry.

3. Exchange and disclosure of background and foreground information and technologies

90. Complementarity is a key element of interfirm alliances in general. This is especially true for R and D collaboration agreements through which partners need to share certain existing knowledge and technologies in their possession (background information or patents) in exchange for complementary capabilities and technologies belonging to the other parties. Still, certain new know-how and information could be developed by the parties in the course of their own R and D work carried out in accordance with a joint programme (foreground information or

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83 Ordonnance No. 67-281 of 23 September 1967, *Journal Officiel*, 28 September 1967 D.S.L. 361 (Fr.).

84 Argentina was also mainly inspired by the French model when it proceeded to legislate on interfirm collaboration agreements in 1983. See G. Cabanellas and J.A. Kelly, *Contratos de colaboración empresaria* (Buenos Aires, Ed. Helisata, 1987), pp. 95 and 96.

85 EC Regulation 2137/85, Article 40. For a detailed description of the EEIG mechanism, see S. Vichatzky, "Le groupement européen d'intérêt économique (GEIE)", *Revue trimestrielle de droit européen*, 2 (1990), pp. 275-306.

86 This happens very frequently in the automobile industry when competitors decide to co-operate in the development of a new model or range of vehicles. See, for instance, extracts from the VW-MANN co-operation agreement in *EC OJ. J.*, No. L37/611, 31 December 1983.

IPRs). Since companies cannot get all the information they need from within their own planned organization, they are forced to disclose some of their own information in order to obtain the necessary complementary knowledge from other co-operation partners and thus be able to launch new products on the market. Clauses concerning such an exchange are therefore of the utmost importance. Parties usually define to what extent and for what purposes they will transfer information and results to the other partners. They also tend to indicate in what field and to what extent parties are obliged to give each other the assistance required for the proper execution of the R and D programme.

91. The extent of this exchange normally varies according to the nature of the partners. If a contract involves competitors (i.e. an horizontal alliance), restrictions on the flow of information are likely to be reflected in the contract. In this context, parties engaged in the development of a new product may provide for an unlimited exchange of information with respect to certain aspects while limiting or precluding an exchange of information in others.[87]

92. As far as *background information and IPRs* are concerned, partners usually commit themselves:

(a) To provide the other partner(s) with the required background technologies or information useful for the performance of a joint R and D project, granting them licences or manufacturing rights if necessary. Such transfers frequently take place on a royalty-free basis. However, some compensatory side-payments to the party which contributed with the most valuable assets (knowledge, work-skill, facilities) could be provided for in the contract;
(b) To use the background technology or know-how provided by the other partner(s) only for the purposes and to the extent necessary for the performance of the contract.

93. In some cases, the work plan determined by the parties may require further co-operation in the acquisition from a third party of patents or other proprietary technology that may be needed to develop a new product or process.

94. Since parties to R and D collaboration agreements exchange complementary knowledge and technologies, they may require from each other some form of guarantee that the background technology will perform to specifications and that they may use it without being threatened by the claims of third parties relating to ownership or users' rights. In this context, partners are in a similar situation to any ordinary purchaser of technology to whom a licence is granted. Indeed, in the framework of R and D collaboration agreements partners will frequently disclose and transfer knowledge they possess instead of paying royalties for the technology they receive. Consequently, parties very often tend to include warranty clauses similar to those included in licensing agreements. They often warrant, *inter alia*, that :

(1) To the best of their knowledge after due inquiry, ownership subsists and is not invalid or unenforceable, in whole or in part;
(2) The execution, delivery and performance of the agreement do not contravene or constitute a default under any contractual restrictions to which they are bound or which affect their rights or any of their properties. Such a clause is very significant at present when new knowledge and technologies developed by firms flow through complex networks of strategic alliances;
(3) They have not previously assigned, transferred, conveyed or otherwise encumbered their rights, titles and interests in the patents, know-how or technology;
(4) Each party is the sole and exclusive owner of the patents and technology, all of which are free and clear of any liens, changes and encumbrances, and no other person or entity has or shall have any claim of ownership with respect to the patents and technology. If one party jointly owns a patent property or information with a third entity, then the former shall ensure that it is entitled to transfer it and that the corresponding consent of the third party was obtained;
(5) There are no claims, judgements or settlements to be paid by them or pending which would

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[87] An interesting example of such an approach is to be seen in the Continental/Michelin co-operation agreement whereby the parties co-operated to develop a new tyre system under some technical processes partially developed by Continental before the conclusion of the agreement. The parties therefore agreed that an unlimited exchange of information was possible only with regard to the mounting systems, architecture and geometry of the new tyre. Exchange of information was confined, in the case of manufacturing methods, to the basic principles governing such processes. For certain other aspects, such as the refinement and adaptation of the new system, partners were required to transmit the relevant information only if the other party was otherwise unable to develop and manufacture the new tyre. See *EC Of. J.*, No. L30/535, 10 November 1988.

prevent the performance of the agreement.

95. With respect to *foreground information or IPRs*, i.e. results and new knowledge acquired in the course of R and D work, they may be made available to other partners provided they are used only for research purposes determined in the agreement. However, results obtained with the research works carried out by each partner employing its own facilities may eventually be shared by the other partners if some form of co-operation either in manufacturing, distribution or marketing is envisaged. Otherwise, if the R and D collaboration agreement is confined to pure co-ordination and co-operation in research, parties may be bound to grant to other partners a non-exclusive licence to use any proprietary results or technology arising from independent research.[88] It should be noted that some agreements draw a distinction -- usually implicitly -- between pre-competitive or generic knowledge and marketable results. Thus, in the framework of joint R and D plans to be implemented independently by the partners, pre-competitive knowledge may be freely transmitted through oral or written communications while marketable results are to be transferred by means of a licence agreement.

96. Besides restrictions on the use of background and foreground knowledge, confidentiality duties are generally incorporated into the contracts in order to commit partners seriously to common R and D work and to prevent key background and foreground information or IPRs relating to certain competitive advantages of the partners from being transmitted to third parties without the consent of each of the partners. This means that parties are unlikely to be entirely free to dispose of background or foreground information or IPRs relating to the R and D collaboration agreements. Furthermore, in some special cases, parties may be required to report to national authorities on the results achieved or the progress made in the course of common R and D. This may occur in cases where parties took advantage of policy incentives for collaborative R and D, such as subsidies or loan facilities. In such cases, parties should specify how possible national reporting requirements are to be met and who will be responsible for preparing and submitting the reports to the relevant authorities. The importance of confidentiality in R and D agreements frequently causes parties to spell out in detail the kind of information or technologies they are precluded from transferring or divulging to third parties as well as how and to what extent they may use them. This is highly understandable, since a breach of these obligations by means of premature publication, disclosure or sale before the filing of a patent application may result in a loss of patentability. It is customary, therefore, for partners to insert clauses in the contracts whereby they agree that:

(1) They shall keep confidential and, other than as provided in the contract, shall not use or disclose, directly or indirectly, any trade secrets, confidential or proprietary information, or any other knowledge, data, information, whether tangible or intangible owned, developed, or possessed by the other party (the confidentiality of which such other parties take reasonable measures to protect), or relating to the patents, technology or new knowledge or information resulting from common R and D works or plans;
(2) Each party shall take reasonable (or all lawful) measures to prevent the unauthorized use and disclosure of such information, and to prevent unauthorized persons or entities from obtaining or using such information. This implies not taking any action which could constitute or facilitate the unauthorized use or disclosure of the information;
(3) Each party may disclose such information to its officers and employees to the extent necessary to enable such party to perform its obligations under the contract provided that such officers and employees have entered into confidentiality agreements for secrecy and non-use of such information;
(4) Each party shall be liable for any unauthorized use or disclosure of such information by its officers and employees.

97. These bans frequently embodied in R and D collaboration agreements are not applicable with respect to knowledge, information, data, materials or documents when the disclosing party can conclusively establish that they:

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88 Alternatively, an agreement may provide for initial joint planning of any development programme of the parties aimed at obtaining a particular new product and for the costs to be shared equally by the parties. Should one party consider that a substance justified further development and the other did not, the former could develop it individually. In this context, parties may agree that the results of such work be made available by the developing party to the other, as if the development work had been undertaken jointly. See, e.g. Beecham/Parke Davis agreement described in *EC Of. J.*, L70/11, 17 January 1979.

(1) Have entered the public domain without such party's breach of any obligation owed to the non-disclosing party or to a third party;
(2) Have become known to the receiving party prior to the disclosing party's disclosure of such information to such receiving party;
(3) Are permitted to be disclosed by such party pursuant to the prior written consent of the non-disclosing party;
(4) Have become known to the receiving party from a source other than the disclosing party (other than by breach of an obligation of confidentiality);
(5) Are independently developed by the receiving party without breach of the R and D joint-venture agreement;
(6) Are disclosed by such party pursuant to governmental or judicial requirement.

98. Non-use and non-disclosure duties, such as those mentioned above, are usually imposed upon the parties during the entire life of the agreement. Nevertheless, such restrictions are often binding upon the parties beyond the expiry of the contract, namely, when parties provide for the joint exploitation and manufacturing of patents and know-how resulting from their R and D collaborative venture. Such joint exploitation by the parties may also imply the survival of the non-use and non-disclosure restrictions relating to patents, information and know-how that existed before the agreement was concluded (background information and IPRs) and that may be required for the manufacture, use and sale of the new product.[89]

99. Other contracts provide that on the expiration of the contract each party will return its copies of all confidential information it received from the other party. Furthermore, parties may agree that confidentiality obligations are to extend for a specific period of time (e.g. five years) following either the expiry of the contract or the launching of the first marketable product. Time limits for non-use and non-disclosure restrictions are normally included in the agreements in order to meet the requirements or criteria laid down by legislation competition.

4. Withdrawal

100. Withdrawal of one of the parties from a common R and D programme is a delicate matter, since parties combine part of each other's background knowledge and disclose foreground information mainly in relation to a converging goal, e.g. elaboration of a new product or the adaptation and development of a new process to meet market needs. The participation of the withdrawing partner in part of the research programme represents the acquisition of a new amount of information and knowledge which the partners could further develop and/or commercialize. Furthermore, a given partner could enter into a collaboration agreement merely to obtain some complementary information it needs and which it could easily use with other competitors in other alliances by simply withdrawing at the "right time" from an R and D joint venture. To reduce such risks, contracts may therefore contain clauses either discouraging the withdrawal of a partner or extending to the withdrawing party the non-use and non-disclosure duties for a certain period of time. Thus, parties may agree that a partner wishing to discontinue the common R and D programme may be entitled to a licence to manufacture, use or sell any product of successful research undertaken by the other party when the results are wholly or substantially based on the results of the original R and D project. However, in order to discourage withdrawal, parties could agree that such a licence may be obtainable only on payment to the continuing party of a substantial percentage of its cost in furtherance of the R and D project.[90] Alternatively, discontinuing parties may be obliged to refrain for a certain period of time following withdrawal from using or exploiting information or know-how belonging to the other parties and from divulging it to third parties. A penalty of a fixed amount of money is sometimes foreseen for each breach of such obligations. Furthermore, it is occasionally agreed that in the event of a dispute it is up to the party that has withdrawn to show proof that it has not exploited the other partners' results or know-how

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89 This is especially true when parties decide to create a separate legal entity to manufacture the new product. In such a case, background information or IPRs will be made available to the corporate joint venture, which must be protected from the transfer of such knowledge to third parties.

90 Under the Beecham/Parke Davis agreement a licence to use or sell the new product could only be granted to the withdrawing party on payment to the continuing party of up to 75 per cent of its costs in the furtherance of the development programme. See extracts of the agreement in *EC Of. J.*, No 2 70/16, 21 March 1979.

in the field of co-operation nor divulged them to third parties.[91] In contracts involving R and D collaboration through a separate corporate joint-venture, the withdrawing party may be subject to additional requirements that may, *inter alia*, consist in : Granting technical assistance to the joint venture after withdrawal; and selling, in the first instance, its own shareholding to the other partners.

101. The fact that R and D collaboration agreements often contain significant limitations on the right to withdraw does not mean that parties may not co-operate on a very flexible basis, expressly acknowledging such a right and allowing discontinuing parties to engage, after withdrawal, in independent R and D relating to the field of co-operation of the agreement.[92]

B. Ownership, protection and exploitation of results

1. Ownership

102. Who will own the results of the research, and how they will be exploited and protected are crucial elements of R and D collaboration agreements. It should be noted that even if research is carried out by each partner in its own facilities and using its own team the results obtained will not be merely the product of the expertise of only one of the partners but of co-ordinated actions carried out within a co-operative framework. Research in such a framework usually rests on three pillars, namely: (1) an exchange of complementary know-how or technologies as well as a regular exchange of information and partial results developed in the course of the R and D work; (2) non-use and non-disclosure (confidentiality) commitments undertaken by the parties in order to avoid the transfer and divulgation of information and results to third parties; and (3) the commitment by parties not to carry out research with third parties in the field of the co-operation agreement (non-competition clauses); they may even commit themselves not to carry out research individually in fields that are closely related to the co-operation agreement.

103. These factors therefore carry some weight in the allocation of IPRs among participants even if the final results are developed by one partner in its own facilities. In such cases, other partners are often granted right of access to the results of the research individually obtained by one party by means of a non-exclusive, royalty-free licence in the case of patentable inventions. It is worth noting that antitrust authorities may not always accept the obligation of the partner(s) to pay royalties for any licence (or cross-licences) they are granted by the other(s) in the context of an R & D joint venture.[93]

(a) Background technology

104. First of all, a few remarks concerning the ownership of *background technology* are necessary. Beside the protection accorded to them during the lifetime of the relevant agreement, parties may decide that:

(1) Each party will remain the owner of its existing know-how and of the inventions realized before the conclusion of the contract;
(2) Certain transfers of existing or background technology take place after the expiry of the con-

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91 See, for instance, the "Carbon gas technology" (CGT) agreement in *EC Of. J.*, No. L376/18, 31 December 1983.

92 See, for instance, extracts of the Vacuum Interrupters Ltd. agreement in *EC Of. J.*, No. L38/34, 31 December 1980.

93 For instance, in the Beecham/Parke Davis agreement mentioned above, when first notified, it required the parties to pay each other royalties for all cross licences. This provision was subsequently deleted at the Commission's request, which regarded it as an unnecessary extension of the scope of co-operation from joint R and D to the marketing of the product manufactured by each partner. Since both partners were capable of individually using the new technology, royalty payments would create a considerable disincentive for the parties to compete with one another (i.e. substantial returns through royalties would have been obtained without production and marketing expenditure). See *EC Of. J.*, No. L70, 21 March 1979.

tract. This situation is likely to occur when parties set up a separate legal entity (corporate joint venture), which will eventually manufacture a new product. Parties may also be bound to inform other co-operation partner(s) about any improvement of background technologies related to the field of the collaboration agreement. This would imply that improvements developed outside the framework of the agreement and after its expiry should be communicated to other partners during a certain period of time. However, the titles to protection of inventions acquired by one partner outside the joint activities usually remain the property of that partner even if there is an obligation to inform the other partner(s) about them.

(b) Foreground technology

105. With regard to the inventions and know-how resulting from the research work (foreground technology or know-how) parties must consider whether they remain the property of the individual parties or are put under joint ownership. In order to allocate ownership and to determine whether partners will undertake the joint exploitation of some inventions, it may therefore be important to draw a distinction between *inventions made independently by the partners* and *joint inventions*. The former are usually viewed as inventions related to the field of co-operation of the agreement financed by one party and made by it in its own facilities, using its own research teams. In this connection, it is frequently provided in non-equity R and D collaboration agreements that each party shall remain the owner of its own work product and all improvements thereof made in the course of co-operation. However, as stated before, other partners may often use and exploit the results obtained independently by one party by means of a non-exclusive, royalty-free licence. Certainly, the right to use, manufacture or exploit the research results by the other partners could be subjected to some restrictions, e.g. exploitation and commercialization of the results could be confined for a certain period of time to specific territories. However, nothing prevents parties from freely agreeing to regard any independently made invention useful for the other partner(s) in the execution of the collaboration agreement as a joint invention. This would undoubtedly be possible when parties have undertaken an intensive exchange of complementary background technologies in the framework of the collaboration agreement. In any case, one should bear in mind that, if parties agree to transfer the results of individual research on a royalty-free basis, certain restrictive provisions are likely to be included in the licensing agreement (e.g. non-challenge of the IPR clause). Such provisions could normally be challenged under competition regulations but they might be tolerated in view of the fact that the licensee does not have any disadvantage, i.e. that he is acquiring new knowledge on a royalty-free basis.[94]

106. With respect to *joint inventions* and bearing in mind the freedom of the parties to define this expression, different approaches may be adopted. Thus, any invention made in the execution of a co-operation agreement by employees of the partners could be considered as a *joint invention*, provided:

> "(i) that at least one of the inventors is employed by one of the co-operation partners and at least one other inventor is employed by the other co-operation partner, irrespective of where the said invention was made, or alternatively;
> (ii) that the invention was made as a result of jointly effected or jointly financed, or both jointly financed and effected, research and development and/or production activities on the part of the co-operation partners by one or more persons employed or commissioned by one of the co-operation partners."[95]

107. In this context, different cases should be distinguished, *inter alia*:

(1) When an invention has been made jointly by employees of all partners. In this case, there are several co-inventors who collaborate in the making of the invention;
(2) When the invention is the product of jointly financed research and development and/or production activities of the collaboration partners. In this case there may be only one inventor, but the inventions are regarded as joint ones because they were made in the framework of the collaboration agreement and were based on jointly financed R and D and/or production ac-

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94 See Ch. Gavalda and G. Parléani, *Droit communautaire des affaires* (Paris, Litec, 1988), p. 552.

95 World Intellectual Property Organization, *Joint Inventive Activity Guide* (WIPO Publication No.650 (E), Geneva, 1984), p. 13.

tivities;

(3) When the invention is the product of work-sharing among partners. In this case, one of the collaboration partners could have made an invention independently which could be useful for the other in the execution of the agreement. Such an invention could also be considered as a joint one.[96]

108. Having defined what partners consider to be joint inventions, it is of the utmost importance to them to contemplate the questions of rights in joint inventions and ownership within the agreement. It should be noted that the industrial property laws of the country of residence or incorporation of the co-operation partners as well as the law applicable to the contract may regulate this matter in a different manner. For instance, if joint invention implies that parties will jointly apply for a patent and thus become co-owners of the patent, they will usually be confronted with two essential issues: (a) can each co-owner independently exploit the patent without being obliged to compensate the other co-owners for any profits derived from it? (b) may a co-owner's share be transferred to a third party without the consent of the other co-owners? The answers to these questions may vary from country to country. In the United States, the granting of a joint patent normally makes each joint patentee (also called joint owner, tenant-in-common or co-owner) the owner of an undivided one-half interest in the patents.[97] Furthermore, "in the absence of any agreement to the contrary, each of the joint owners of a patent may make, use or sell the patented invention without the consent of and without accounting to the other owners".[98] Conversely, in the absence of an agreement to the contrary, the European countries in general as well as Japan require consent among co-owners of a patent when any one of them disposes of its rights in the patent.[99]

109. It should be taken into account that rights in joint inventions do not exist simply when a title of protection (patent, inventor's certificate, utility model registration, industrial design registration, etc.) has been granted. There are certain pre-existing rights that have to be considered, namely, the right to obtain a title of protection for the invention in the country of establishment of a partner or, in other countries, the right to work the invention in the country of incorporation or establishment of the co-operation firms, the right to export or import the products incorporating the invention or industrial design, and the right to transfer any of the aforementioned rights.[100] It is recommendable, therefore, that partners expressly specify in the contract: (i) whether joint inventions are tantamount to co-ownership; (ii) whether joint rights should automatically imply that they must be exercised jointly by the collaboration partners; (iii) whether each co-owner is entitled to make use of the invention without being required to compensate the other co-owners for profits derived from it.

110. In practice, in long-term R and D programmes parties may envisage different solutions with regard to joint inventions:

(1) The respective research and development managers of each party may decide on a case-by-case basis who will be the owner of the inventions and the rights deriving therefrom. They may also decide what will be the most suitable form of protection for the inventions;
(2) Joint ownership of the rights stemming from the results. In this context, parties may provide for joint application and even exploitation of patents. Indeed, there will be cases in which parties will prefer to apply separately for patents;
(3) Allocation of the property of joint results by reference to separate areas or results if possible.

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96 *Ibid*, pp. 13 and 14.

97 Of course, if there were three joint inventors, each would own an undivided one-third interest, and so on. See R.P. Merges and L.A. Locke, "Co-ownership of patents: A comparative and economic view", *Journal of the Patent and Trademark Office Society*, vol. 72, No. 6 (1990), pp. 586 and 587; and T.G. Field, "Brief survey of intellectual property", *IDEA, The Journal of Law and Technology*, vol. 31, No. 2 (1990), p. 97.

98 Merges and Locke, *op.cit.*, p. 587.

99 *Ibid.*, pp. 590-592.

100 *Joint Inventive Activity Guide*, *op. cit.*, p. 15.

111. In this context, it has been argued that, rather than insisting on joint ownership of joint inventions, co-operation partners should, for the sake of convenience, attribute ownership to only one of the partners, the rights of other partners (user rights) being especially contemplated in either the same collaboration agreement or in a separate contract.[101]

2. Protection of intellectual property rights

112. It is essential for the co-operation partners to an R and D collaboration agreement to determine how the results of co-operative research will be protected. Owing to the uncertainty as to the success of the collaborative R and D venture, it may sometimes be impossible for partners to determine this question from the outset. It is recommended that, in such cases, partners should establish adequate rules or procedures to determine at a later date the way in which results will be protected and who will be responsible for the maintenance and defence of IPRs. The existence of basic procedural rules to discuss these matters may facilitate negotiations between co-operation partners if some tension arises as soon as parties envisage the prospect of a successful commercialization of the R and D results. With respect to the protection of the results, a distinction is to be drawn between inventions independently made by one of the partners and joint inventions.

(a) Inventions independently made by one of the co-operation partners

113. Inventions related to the field of the agreement that are made by one party in its own facilities using its own research team will often be owned by that party. However, since such an invention is the product of co-operative and co-ordinated action between partners, other parties have access to the results by way of a royalty-free, non-exclusive licence. It may be argued therefore, that it is for the owner of the invention to decide on the measures to be taken to secure legal protection in the owner's country and in other countries. It may also seem reasonable to maintain that it is up to the owner of such an invention to defend and enforce the rights derived from it. Nevertheless, since the other co-operation partners will usually make use of and benefit from the invention on a royalty-free basis, it would be too heavy a burden to impose these obligations on the owner of the invention. If the owner were granted a patent, the revenues to be obtained under licensing agreements with third parties would usually be in the form of royalty remuneration which, at least in the early years of the licence, is likely to be modest. For example, the cost of a patent infringement suit in the early years could be well in excess of the royalty remuneration.[102] To avoid such situations, R and D collaboration agreements may include clauses providing for co-operation among partners with regard to the acquisition and defence of IPRs. In some cases, co-operation partners agree that each of them shall afford assistance, in the country of its establishment or incorporation, to the other partner(s) in acquiring legal protection for independently made inventions and in detecting and proceeding against infringements if so desired by them.

114. The expenses incurred in applying for titles of protection and maintaining them in force in the country of establishment or incorporation of other partners or in third countries will generally have to be borne by the partner who filed the application or who owns the title. It is worth noting that some agreements establish that any decision with regard to the surrender of a title of protection of an invention made independently in the course and within the framework of the R and D collaboration agreement should be taken by either partner only after preliminary consultation of the other partner(s). The agreement might provide that the other interested partner(s)

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[101] See D. Rochat, *Inventions et brevets. L'Europe des brevets* (Berne, Georg Eshel, 1989), p. 140; A. A. Horton, "Opportunities and pitfalls in research and development agreements", *European Intellectual Property Review*, vol. 6 (1991) p. 214; and M. F. Radcliffe and J.H. Clowes, "Strategic alliances and intra-industry licences", *The Computer Lawyer*, vol. 8, No. 4 (1991), p. 27. Disparities among national legislations and management difficulties are strong reasons to avoid joint ownership. However, in collaboration agreements involving domestic partners joint ownership might entail fewer problems. Thus, a study on Canadian technical alliances has shown that in 14 alliances out of 34 that were examined (e.g. 41 per cent of the cases), partners adopted the collective property of the results. See J. Noisi and M. Bergeron, "Technical alliances in the Canadian electronics industry" (Montréal, Centre de recherche en développement industriel et technologique (CREDIT), 1991), p. 38.

[102] See D.J. Ryan, "Legal arrangements for the commercial acquisition of technology", *Intellectual Property in Asia and the Pacific*, No. 24 (January-March 1989), p. 11.

be given an opportunity to maintain the title in force at its/their expense.[103]

(b) Joint inventions

115. Once a joint invention has been made within the framework of an R and D collaboration agreement, partners will be confronted with such questions as whether or not to file applications for legal protection and, if so, when. Detailed provisions and even agreement on all these questions may prove to be impossible from the outset. Hence, agreements sometimes contain provisions dealing with the method of reaching a decision on these matters. The most practical solution is to require agreement by all the partners in every case. Nevertheless, contracts should also include provisions to deal with cases where partners did not agree on the appropriate form of protecting a joint invention or on the filing of applications. The former situation is likely to arise in certain fields, such as software or biotechnology.[104] In order to overcome such problems, "the co-operation agreement could establish certain principles, for example, the principle that applications for titles of protection are to be filed unless all partners agree that this should not be done".[105]

116. Other problems should be envisaged by the partners in R and D collaboration agreements, namely, the case of a partner which does not wish to undertake or collaborate in any action for obtaining or maintaining legal protection for a joint invention. It has been suggested that, in such cases, the collaboration agreements should "contain a provision which, in order to avoid legal insecurity, could require, for example, that the co-operation partner concerned should in due time enter a waiver, which would entitle the partner interested in the invention to file applications, or act otherwise, in his own name".[106] Such a waiver of the right to file or preserve a title of protection may contribute to facilitating the use of the inventions by the partners.

(c) Forms of protecting joint inventions and filing procedures

117. A collaboration agreement may involve companies incorporated or established in different States. Their respective national laws as well as the laws of third countries where partners intend to obtain legal protection could provide several differing forms of protection. Parties will have to decide which form of protection will be chosen in the countries in which they will seek to obtain protection. It should be noted that the domestic legislation of some countries allows for a choice between a patent and utility certificate or registration as a utility model. Besides national laws, parties should also take into account certain rules embodied in bilateral and multilateral treaties concerning the protection of intellectual property rights when deciding on the form of legal protection to be chosen, as well as on the procedure for filing applications and the expenses associated with such a procedure. For instance, the former Soviet Union concluded a number of bilateral treaties for the protection of IPRs with some European States,[107] the rules of which should be considered when collaboration in R and D involves partners from the countries parties to these agreements.

103 *Joint Inventive Activity Guide*, *op. cit.*, pp. 38 and 39.

104 With respect to the special problems related to the protection of inventions in such fields, see A. Körber, "Special questions of newly emerging technologies", in *International Forum on the Role of Industrial Property in Economic Co-operation Arrangements*, Moscow, 1989, WIPO Publication No. 680 (ER), pp. 101-108; R. Eisenberg, "Proprietary rights and the norms of science in biotechnology research", *Intellectual Property Law Review* (1989), pp. 29-83; and J. Straus, "Ethische, rechtliche und wirtschaftliche Probleme des Patent und Sortenschutzes für die biotechnologische Tierzüchtung und Tierproduktion", *GRUR International*, 12 (1990), pp. 913-929.

105 *Joint Inventive Activity Guide*, *op.cit.*, p. 20.

106 *Ibid.*, pp. 20 and 21.

107 Agreement between the former Soviet Union and France on mutual protection and use of the rights of industrial property of 19 May 1970 and the Agreement between the former Soviet Union and Austria on the legal protection of industrial property of 10 April 1981.

In order to tackle the difficult questions related to the protection of inventions, parties should also take advantage of the recommendations and norms that may have been elaborated by bilateral commissions on scientific and technological co-operation and industrial property issues within the framework of bilateral agreements on co-operation in science and technology between States.[108]

118. Furthermore, in European countries that are parties to the European Patent Convention, there exists a choice between a national patent and a regional patent.[109] Partners to an R and D collaboration agreement will have to decide for which patent they will apply. In this connection, it is interesting to note that, within member States of the African Intellectual Property Organization (OAPI), only a regional patent will be available.[110]

119. Another problem confronting partners willing to use the joint invention in different countries is where the first application is to be filed. It should be noted that the first application will serve, in other countries, as a basis for claiming priority under the Paris Convention for the Protection of Industrial Property. In many instances where the joint invention is made in the country of one partner, parties are inclined to file the first application in that country. Further applications could be filed in the countries of the other partners as well as in third countries. It may be claimed that, as a logical corollary of joint rights in joint inventions, partners should apply jointly for legal protection in their respective countries as well as in any other third country. However, for practical purposes, it may be convenient for one of the partners to act on behalf of the other(s) in taking the necessary measures for obtaining legal protection. Therefore, when all partners are interested in receiving legal protection in their respective countries and in third countries, the collaboration agreement could include certain provisions on the question of whether applications should be filed on behalf of all the parties, or whether partners would determine on a case-by-case basis in whose name the applications should be filed. However, if one co-operation partner "waives the right to file an application in any third country, the other partners should be entitled to exercise the right to file an application in that country in their own names and at their expense". This would entitle them to exploit the invention by manufacture and to grant licences in that country.[111] The partners who waived the right to seek or maintain legal protection in a given country may, in any case, be entitled to exploit the invention in that country. However, they would not be able to grant licences or take any initiative against any infringement of the titles of protection taking place in that country. In any case, in R and D collaboration agreements involving firms incorporated or established in different States, the parties should consider the possibility of taking advantage of the procedures provided for in the Patent Co-operation Treaty (PCT) and The Hague Agreement Concerning the International Deposit of Industrial Designs, which simplify the securing of industrial property titles in the States that ratified those treaties. The PCT establishes a system of international application for protection of inventions and a simplified procedure for obtaining a search report concerning prior art. Under this Treaty, provided that certain conditions are fulfilled, an international application may have the effect of a regular national application in the States that ratified the Treaty and where partners are interested in securing legal protection.[112] The PCT also simplifies the obtaining of a search report on prior art. If such a search shows that the prior art will probably impede the granting of a patent to partners and, hence, that it is not worthwhile to pursue the application, partners could make considerable savings by being relieved of the cost of the application procedures.[113]

120. Besides deciding on questions such as who will file the application and conduct the patent

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[108] To these belong "The Order of Settling of Issues of the Legal Protection and Use of Inventions, Industrial Designs (Models), Trademarks and Other Subjects of Industrial Property in the Course of Realization of Economic, Scientific, Technological and Industrial Co-operation", approved by the Soviet-Austrian Commission on Economic, Scientific and Technological Co-operation in October 1985. See G.A. Matveev, "Practical questions of legal protection of industrial property under the existing scientific and technical agreements of the USSR with foreign countries", in *International Forum on the Role of Industrial Property in Economic Co-operation Arrangements*, *op. cit*, p. 30.

[109] Within the EEC, the Community Patent Convention - which will probably come into force in December 1992 for most of the EEC Member States - is intended to abolish within the Community restraints on free trade caused by the exclusive territorial effect of the individual national patents. To this end, the Community Patent Convention provides that, for the territory of the European Community Member States, a patent can be requested and granted only as a unitary patent, *viz.* as a Community patent. For more details on the subject, see H. Ullrich, "Patentschutz im europäischen Binnenmarkt", *GRUR International*, 1 (1991), pp. 1-13.

[110] See Article 6(2) of the Agreement Relating to the Creation of an African Intellectual Property Organization (OAPI Convention) of 1977.

[111] *Joint Inventive Activity Guide*, *op. cit.*, p. 25.

[112] Article 11 (3) and (4) of the Patent Co-operation Treaty (PCT) as amended in 1979 and modified in 1984.

[113] Article 15 of the PCT, and *Joint Inventive Activity Guide*., *op. cit.*, p. 24.

procedures as well as the sharing of the cost of the acquisition and maintenance of titles of protections, parties usually establish some co-operation duties with regard to the defence and enforcement of their industrial property rights. It is evident that the defence of rights related to joint inventions affects the economic interests of all collaboration partners since any infringement may undermine their co-operation objectives and their expectations of increasing their competitiveness. For these reasons, partners often include co-operation mechanisms to detect and proceed against infringements of titles granted for their inventions. If the R and D collaboration agreement involves companies established in different countries, partners may agree to assist each other in detecting infringements in the countries where they are incorporated or established. They are also sometimes required to take measures to prevent or stop any infringement or to secure damages. Different arrangements among partners are possible. They may agree that the partner that filed the application in a given country on behalf of the other parties may also be in charge of defending titles against infringement in that country. In any case, the main questions related to the defence and enforcement of rights (such as initiating a lawsuit or taking action to invalidate a title belonging to a third party) are generally decided by consent between partners. However, another possibility is that the agreement, while requiring co-operation in detecting infringement, allows each partner to decide individually whether to take any steps to defend a title. Should both parties initiate legal proceedings, they may be required to endeavour in good faith to reach an agreement with respect to the control of the litigation and in what proportion awards, if any, are to be shared. In this context, parties generally bear their own litigation costs.

3. Exploitation of results

121. Contractual arrangements usually determine how parties will undertake the exploitation of the results and to what extent. This question is a core issue, which very often demands lengthy negotiations during the drafting of contracts. The central issue to be tackled is whether partners are going to exploit the inventions jointly or separately.

122. First of all, if one party owns all the know-how and patents, exclusive or non-exclusive licences may have to be granted to other partners. In such cases, the nature and scope of, and limitations on, the right to use, manufacture or commercialize the results are very often specified in a separate licensing agreement. Such a contract often includes geographic restrictions as well as conditions or prohibitions regarding sub-licensing to third parties. However, due account should be taken of the applicable competition laws.

123. With respect to the know-how independently developed by the parties in the course of the R and D work under the agreement, the parties may either include clauses specially providing for communication and transfer of the know-how to the other partners after the expiry of the collaboration agreement,[114] or conclude a separate agreement determining the terms and conditions of the transmission. Clauses governing, in particular, the use and divulgation of the know-how developed and owned by one party are used by that party to protect either new knowledge that is not patentable or an invention that may be undergoing the process of patentability or that the owner does not want to patent.[115] Again, the receiving party may be required to use the know-how solely for the purpose of exploiting the results arising from the R and D collaboration agreement without divulging it to third parties. As in the case of licences, the relevant legislation on competition law will have to be considered by the licensor.

124. Secondly, in cases where each party owns part of the patents or know-how, mutual licences are sometimes granted. Payment of some royalties may be needed to compensate unequal con-

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[114] Transfer of know-how can be mentioned in the same R and D collaboration agreement. Thus, parties could agree that each party should have the right to receive from the other a non-exclusive royalty-free licence with full rights to grant sub-licences to manufacture (or have manufactured), use and sell a new product (developed during the life of the collaboration agreement) without restriction with regard to any know-how.

[115] It has been said that "some competition policy authorities believe that firms are increasingly keeping their intellectual property in the form of know-how rather than seeking patent protection, citing the cost and delays in obtaining patents, the lengthy litigation which can accompany a patent application and the weak protection afforded by the patent laws of some developing countries". See OECD report on Competition Policy and Intellectual Property Rights (Paris, 1989), p.8. See also B. Mercadal and Ph. Janin, *Les contrats de coopération inter-entreprises* (Paris, Ed. Juridiques Lefebvre, 1974), pp. 274 and 346.

tributions in the R and D programme or in the allocation of ownership rights. Again, licences reciprocally granted might place some limitations on the use of the new technology, e.g. conditions under which sub-licences could be granted to third parties, territorial restrictions, and so on.

125. Thirdly, if the parties jointly own the know-how and patents, they may decide to exploit the results either separately or jointly or grant licences to third parties. Alternatively, in cases of joint ownership of results, exploitation rights of joint patents may be divided between the parties on a geographic or field-of-use basis.

(a) Joint production

126. In many instances parties will have to co-operate beyond pure R and D activities. For example, in order to transform a new idea into a marketable process or product, parties will have to co-operate in its manufacture in order to reduce risks and costs. They may either specialize in the manufacture of certain parts of a product, which may be exchanged for the components made by the other partners, or create a special facility (corporate joint venture) to be responsible for the manufacture of the new product. Competition laws increasingly contemplate co-operation in manufacturing as the natural economic correlative of joint or co-ordinated R and D works between two or more partners. Thus, EEC Commission Regulation No 418/85 [116] (Block Exemption for R and D joint ventures) exempts from the application of competition laws those R and D joint ventures that have imposed competitive restrictions on the parties. Such restrictions may consist, for instance, in the obligation to procure the contract products exclusively from parties, joint organizations or undertakings or third parties jointly charged with their manufacture.

127. Owing to the uncertainty and high risks surrounding R and D collaboration agreements, co-operation partners might prefer to determine at a later stage whether they wish to engage in joint production or not. Parties could therefore deem the agreement terminated if they fail to succeed in the joint R and D activities. Conversely, in the event of success, parties may agree to notify each other in writing -- before a certain date -- of their intention to enter freely into a production joint venture.[117]

(b) Co-operation in licensing

128. The partner who owns an independently made invention will, in principle be free to license or assign its rights to third parties. The same partner would normally be entitled to surrender the rights concerning such an invention. Nevertheless, since such an invention was made possible by an exchange of background technology and information between partners, some collaboration agreements provide that the said partner should inform and consult the other partner(s) about its intention to license or assign its rights to third parties. This requirement is particularly important after the expiry of the contract because, during the life of the agreement, partners will normally be prevented from transferring any foreground information or rights in order to ensure the success of the venture. Certainly, any restrictions on freedom to license to third parties may be allowed by antitrust authorities only if they are temporary and necessary to ensure the successful commercialization or exploitation of technological innovations. In the case of joint inventions, a distinction could be made between the country where partners are established and/or those in whose markets they are active and third countries. In R and D collaboration agreements involving Japanese and European companies, it is frequently agreed that the Japanese company has the right to grant licences in Japan and the European firm has the exclusive right to grant licences in certain European countries. Licensing to third countries (e.g. outside Japan and Europe) must be based on mutual agreement.

129. Licensing for third countries may be effected in two ways: (i) if industrial property titles are owned jointly by the partners, licence contracts could be concluded either jointly or, if allowed under the applicable law, by one of the co-operation partners on behalf of the other(s); and (ii) if

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[116] Commission Regulation (EEC) No. 418/85, 19 December 1984, *EC Of. J.*, No. L53/5, 22 February 1985, Article 4 (c).

[117] See, for instance, the example of the development agreement published in *Diritto del commercio internazionale*, 3,1 (January-June 1989), pp. 177-182, together with the comments by F. Lanfranchi in "L'utilizzo di techniche di venture capital per il finanziamento di programmi di innovazione tecnologica: un caso concreto", *op. cit.*, pp. 169-176.

industrial property titles in certain third countries are owned by only one of the partners, whereas the other parties own titles in other third countries, the co-operation partners could agree that licensing in a third country should be effected by the partner owning the title.[118]

130. An important question with which partners are usually confronted is how they will distribute the profits derived from licensing a joint invention. In allocating profits, the contribution of each partner is normally taken into account. However, national legislation (of the home countries of the partners and third countries) taxing royalty revenues or restricting the right to transfer payments in general should also be considered. In order to overcome the problems related to the transfer of revenues from one country to the other, parties may agree that profits derived from licensing joint inventions in third countries should be shared, whereas revenues gained from licensing in their respective home countries need not be shared between the co-operation partners.

131. Another possibility of complementing the jointly pursued R and D and of coping with the problems associated with licensing joint inventions is the creation of a common entity by the partners to undertake the joint exploitation of patents and know-how developed in the course of joint R and D. Such exploitation may even include background information and patents that existed before the collaboration agreement was concluded and that are connected with its objectives. The common entity might be a separate legal person in which each party holds an equal interest and which could act as their sole and exclusive agent for patents and know-how.[119] Within such a framework, partners may of course lose their freedom to grant licences independently to third parties. Such co-operative schemes should therefore be considered in the light of the applicable antitrust laws.

(c) Co-operation in marketing

132. In certain cases, co-operation among partners covers not only R and D and production, but also the marketing of the new product. Such vast co-operation is frequently envisaged in fields such as aircraft production, space and telecommunications, where parties collaborate during the entire process from R and D to commercialization, implementing their co-operation through industrial consortia. In these mature, high-technology industries, the high costs of new product development, demanding requirements for systems integration and the nature of political barriers to market access may justify such far-reaching co-operation.[120] Besides these special market segments, firms in other sectors very often tend to link collaboration in product development and design with joint marketing strategies. If the collaboration agreement involves important competitors which are technologically equal, partners will tend to organize an autonomous management structure entrusted with the implementation of marketing strategies. In addition to the antitrust problems arising from joint marketing policies of independent firms (e.g. price fixing), other specific problems related to trademarks may also have to be tackled. Thus, if partners wish to use a common trademark for new goods produced as a result of joint R and D activities, due account must be taken of the differences that may exist in national legislation in respect of the duration, registration, use and licensing of trademarks. It should be noted that certain national laws proscribe the registration of a trademark on behalf of two or more different enterprises. Such a registration is likely to be considered incompatible with the function of a trademark as a sign which identifies a product or service with a particular enterprise that is responsible for their quality.[121]

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118 *Joint Inventive Activity Guide, op. cit. p. 32.*

119 The creation of such an entity was envisaged in the Continental/Michelin agreement, excerpts of which are published in *EC Of. J.*, No. L30/503, 10 November 1988.

120 Mowery and Rosenberg, *op. cit.*, p. 250.

121 *Joint Inventive Activity Guide, op.cit., p. 45.*

Chapter V

COMPETITION POLICY AND JOINT RESEARCH AND DEVELOPMENT AGREEMENTS

A. Introduction

133. Government intervention in the economy may influence the strategic decisions of companies. It may create both constraints and opportunities. It has been stated that "Governments also have a sufficient impact on the evolution of industries and on the nature of rivalry within industries to make careful consideration of their actions -- current and potential -- of critical importance in formulating and implementing global strategies".[122] The increasing globalization of the economy, together with the fact that innovation has become a major source of comparative advantage, have brought about substantial changes in the role of governments in the economy. Although governments do not appear in this context as the main leaders of industrial organization or restructuring, they still possess important means of influencing economic and technological development. Governments increasingly promote interfirm collaboration and the creation of dynamic technological links between those companies that are integrated in the communities they rule. The clearest example of such a trend is the direct support granted by governments to pre-competitive research by means of national or regional R and D programmes. As emphasized in the UNCTAD *Trade and Development Report, 1987*, "in some countries technological innovation policies are seen as a major part of a process of indicative planning. This seems to be the case in countries -- for example, Japan, France and partly Italy, where innovation policy is used as an important instrument for economic policy and where the instrumentalities as well as the objectives of that policy are formulated through consultative and co-ordinative procedures and institutions within Government and between Government and industry."[123] The active role played by Governments in supporting and/or granting incentives (e.g. tax incentives, loan facilities and R and D programmes) for innovation has been described as being part of a new kind of relationship between public authorities and industry. In this connection, one director of an EC R and D Programme maintained that States are increasingly engaged in a new type of dynamic "alliance with private companies, the competitiveness of which should be maintained or increased in world markets".[124] In this context, governments (mainly of industrialized countries) tend indirectly to encourage joint R and D by strengthening the protection of intellectual property rights, enacting new regulations on joint research activities and relaxing competition laws with respect to R and D joint ventures. While the strengthening of intellectual property may indirectly encourage innovation and influence investment decisions of firms, competition policy may have a considerable impact on the structure of the R and D collaboration agreements, particularly if parties envisage the joint exploitation of the results. Depending on the nature of the R and D project, parties may be obliged to notify the antitrust enforcement agencies of their co-operation agreements. These agencies are authorized, in some instances, to make approval of the agreements subject to the amendment or deletion of certain provisions that are deemed anticompetitive or are viewed as unnecessary restrictions for the implementation of the R and D works.

134. In any case, what makes competition law particularly complex is the fact that, unlike many other regulations, antitrust regulations are not particularly concerned with the legal form adopted to carry out a joint activity, but mainly with the behaviour of the parties.[125] In addition, assess-

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[122] Ives L. Doz, "Government policies and global industries", in Michael Porter (ed.), *Competition in Global Industries*, (Boston, Harvard Business School Press, 1986), p. 226.

[123] *Trade and Development Report, 1987* (United Nations Publication, Sales No. E.87.II.D.7).

[124] R. Petrella, Director of the FAST Programme, see "La mondialisation de la technologie et de l'économie: une hypothèse prospective", *Futuribles*, 135 (1989), p. 9.

[125] See H. Lesguillons, "Contrats internationaux de coopération: les contraintes tenant au droit européen de la concurrence", vol. 9, *Droit et pratique du commerce international* (1983), p. 379.

ments of the effects of the partners' behaviour on trade and the promotion of the competitive process differ, depending on the economic theory applied. Besides economic analysis, political goals, such as emphasis on integration of markets or the preservation of a competitive system that enables small and medium-sized enterprises to enter new markets and actively promote innovation, may also significantly influence competition policies. Despite the differences in these policies, which may rely principally on economic analysis or be strongly influenced by social or political considerations, one trend is recognizable in developed countries: competition laws are being adapted and interpreted in such a manner as to facilitate technological innovation.

B. Competition policy and joint R and D in the United States and in the European Community

1. Competition policy in the United States

(a) Changes in economic analysis and the gradual erosion of per se prohibitions

135. In the United States, the *Sherman Act* and the *Clayton Act* constitute the basic federal antitrust legislation. These Acts are also applicable to intercompany co-operation in general. The Sherman Act makes illegal any contract, combination or conspiracy that results in a restraint of trade. It also bans monopolization, as well as attempts, combinations or conspiracies to monopolize. The Clayton Act supplements the Sherman Act, prohibiting mergers that may substantially lessen competition or tend to create a monopoly. Both Acts share the objective of protecting and promoting free and full competition in the market place and of stemming economic concentration. They embody broad proscriptions for unlawful conduct that may be applied to a vast range of market behaviour. The key statutory phrases, "restraint of trade" and "monopolize", were not subject to extensive analysis in the legislative history of either Act. This task was left to the courts, which have extensive discretion to decide what specific practices are prohibited in particular cases. Since the 1890 passage of the Sherman Act, the courts have applied antitrust laws to a wide variety of business practices. Nevertheless, the interpretation and evolution of the law have not always followed a consistent path. Thus, in the period from the 1940s through the early 1980s, the courts tended to expand the scope of the antitrust laws. The Supreme Court enjoined several mergers during this period, holding that the increased percentages of market share and concentration resulting from the mergers were presumptively illegal. During this period, government antitrust policy and judicial interpretation of antitrust laws were strongly influenced by the so-called "Harvard Structuralist" School, which put great emphasis on market structure and barriers to entry into markets as the primary determinants of market performance. Harvard Structuralists recommended that Government antitrust policy should be directed principally at preserving competitive market structures by preventing the development of oligopoly and concentration. Competitively structured markets were generally considered to be a greater stimulus for innovation than concentration of R and D activities in large business concerns.[126]

136. However, during the last decade and a half, the Supreme Court has tended to narrow the range of activities that constitute violations of the antitrust laws, i.e. the scope of *per se* violations has been reduced.[127] Therefore, an increasing number of agreements and business practices are examined by courts under the "rule of reason" standard of interpretation. This requires proof that the restraints are "unreasonable" restraints on competition. Courts therefore examine the economic effect of the agreements, i.e. they consider whether restrictions on competition are not outweighed by pro-competitive efficiencies. The Antitrust Division, one of the United States antitrust enforcement agencies, as well as the courts, are said to be increasingly influenced by the so-called "Chicago School" of economic analysis, many representatives of which consider that "the

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126 G.E. Weston, "New trends in the U.S. antitrust law", 15 *IIC* 3 (1984), p. 271.

127 *Per se* violations are acts intrinsically contrary to the law. Such practices are automatically regarded as unlawful without any further analysis. See H Desquillons, "Coopération en matière de recherche et développement et droit anti trust des Etats-Unis", *Droit et pratique du commerce international*, vol. 9, No. 1 (1983), p. 89.

free private market will usually automatically promote consumer welfare by determining the most efficient market structure if there is no government intervention".[128] The goal of antitrust is thus efficiency in resource allocation.

137. Many antitrust experts believe that the influence of the Chicago School theories was clearly reflected in the *GTE-Sylvania* decision of the Supreme Court in 1977, when it held that vertical territorial restraints in manufacturers-dealer contracts were subject to a rule-of-reason test.[129] In other cases, the Supreme Court decided not to apply the *per se* rule to horizontal restraints, including price fixing in the regulation of intercollegiate football television agreements.[130] In the *Business Electronics Corporation versus Sharp Electronics Corporation* case, the Supreme Court narrowed the *per se* rule against vertical price fixing. Later changes in economic analysis were also reflected in the interpretation of antitrust rules with respect to R and D joint ventures as well as in the National Research Act of 1984 and in the 1988 Department of Justice Antitrust Guidelines for International Operations.

(b) The application of the rule-of-reason standard to R and D collaboration agreements

138. In 1979, a Court of Appeals upheld the application of the rule-of-reason standard to R and D joint ventures in *Berkeley Photo, Inc. versus Eastman Kodak Company*. In this case, Kodak decided to develop new flash devices with Sylvania Electric to be used with Kodak cameras. The plaintiff, a camera manufacturer, charged Kodak, among other things, with having conspired to restrain trade in the development of such devices, because Kodak caused Sylvania's new "Magicube" flash bulb design to be kept secret from Kodak's competitors until its own line of magicube type cameras was released. A similar course of action was followed by Kodak with respect to the new flash devices of General Electric, the introduction of which was delayed for several years while Kodak sold the new magicube-type cameras.[131] The case was tried before a jury, which considered that the Kodak/Sylvania and the Kodak/GE secrecy agreements constituted unreasonable restraints of trade under the Clayton Act. On review, the Court of Appeals upheld the jury's findings, stressing Kodak's monopoly power in cameras. The Court was of the opinion that joint ventures with a monopolist had to be carefully scrutinized to avoid raising already substantial barriers to entry into a monopolized market. It is interesting to note that the Court rejected a *per se* approach because it could bar new developments. Instead, the rule-of-reason standard was applied which meant that due consideration must be given to "the size of the joint ventures; their share in the respective markets; the contributions of each party to the venture effort, whether one or both parties would undertake a similar project either alone or with a smaller firm in the other market; and the nature of the ancillary restraints imposed and the reasonableness of their relationship to the purposes of the venture".[132] In conclusion, according to the Court's view, collateral or ancillary restraints in R and D joint ventures, such as the withholding of information or resources developed by the parties to a joint venture from other market participants until the products are marketed or until the joint venture is dissolved are not to be considered *per se* violations.

139. Similarly, in 1980, the Department of Justice published its Antitrust Guide Concerning Research Joint Ventures, which set forth the parameters under which joint R and D ventures had to be conducted without risk of antitrust violations. As in the case mentioned above, the Department of Justice (DOJ) Guide stressed the application of the rule-of-reason standard to R and D ventures. It was asserted that United States enforcement agencies were not to challenge restraints ancillary to R and D ventures if they directly furthered the venture's essential purpose and were limited in scope and duration. The Guide also specified the criteria under which ancillary restraints had to be scrutinized, such as what percentage of the industry was included in the joint venture, whether and when the results of the venture were to be disclosed to the remainder of the industry, whether the results of the venture would be beneficial to consumer welfare and the nature and size of the participants. Furthermore, the Guide made a clear distinction between the types of research to which joint R and D ventures could be devoted. Thus, basic research, i.e. research

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128 Weston, *op. cit.*, p. 272.

129 Continental T.V., Inc. versus GTE Sylvania, Inc. 433 U.S. 36 (1977). See also *Antitrust & Trade Report*, vol. 59, No. 1495 (December 1990), pp. 5-13.

130 National Collegiate Athletic Association (NCAA) versus Bd. of Regents, Univ. of Okla., 468 U.S. 85 (1984).

131 OECD, *Competition Policy and Joint Ventures* (Paris, 1986), para. 186.

132 Berkeley Photo, Inc. *versus* Eastman Kodak Company, 603 F.2d 263, 302 (2dC, 1979), pp. 301 and 302.

that is far removed from product development and commercialization, was to receive much more lenient antitrust scrutiny than joint R and D ventures oriented to applied research, which is directed towards commercial development. Since the former type of research is far removed from application in the market place, it was not regarded as a serious threat to competition, even if it was to be conducted jointly. Conversely, research aimed at product development was deemed more likely to generate anticompetitive practices by the parent corporations of the joint venture, both with respect to the specific end-product of the research and in areas outside the scope of the research.[133] As stated in the OECD report on Competition Policy and Joint Ventures, the generally favourable attitude of the United States Government towards R and D joint ventures was already apparent from the DOJ reviews of joint R and D proposals before the publication of the 1980 DOJ Guide. Thus, "during the period 1968-1980, the DOJ responded favourably to (or declined to review) 19 of 21 proposed R and D joint ventures which asked for review and clearance".[134]

140. It should be noted that in one of two cases not receiving clearance *(United Technologies)* the theory of potential competition was applied in 1975. The case involved a proposal by United Technologies and Rolls-Royce to develop, manufacture and sell a small low thrust jet engine for use on private jet aircraft. The Department of Justice based its negative decision on the belief that the financial risks and technical challenge of building such an engine could be undertaken by either party satisfactorily, thus the venture carried "a strong risk of eliminating actual or potential competition" in the development of the small engine.[135] It must be recalled that the theory of potential competition applies to concentrated markets with high barriers to entry and composed of firms with oligopolistic behaviour. In this context, the presence of a business entity not yet engaged in the market, but on the edge of the market and ready to enter when conditions are favourable will have a pro-competitive effect on the present market participants.[136] Therefore, if a potential competitor enters the market by merger or joint venture with a dominant market participant, it is removed as a potential competitor to the existing participants. In the context of an increasingly favourable attitude towards joint R and D, the Department of Justice cleared in 1983 a new United Technologies proposal for joint development of the low thrust engine, this time with more competitors. Contrary to its first decision, the Department of Justice doubted whether more than one of the five joint ventures involved in the project would seek to enter the market independently and therefore concluded that the venture did not threaten potential future competition in the low thrust engine market. It also doubted whether the venture would affect existing or potential competition in other markets in which the parties to the venturers compete (spillover collusion) since the firms, having incurred large costs to develop the new product, had great incentives to compete for sales.[137] The main differences between the two Department decisions with regard to the United Technologies proposals seem to be the following. First, there is the assessment of the effects of the United Technologies proposals on potential competition. In *United Technologies I*, the Department considered that independent development by each firm was likely without the joint venture, while independent development was held to be unlikely in *United Technologies II*.[138] Secondly, more emphasis was put on the novelty of the product and the incentives to compete in sales, which could outweigh the restrictions on the research market. The acknowledgement of the increasing importance of R and D and the high costs and risks associated with it may, therefore, lead to non-application of the theory of potential competition to R and D joint ventures.[139] Thus, the present view of the Department of Justice is that "even a joint venture that includes a large portion or even all of the competitors in an R and D market

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133 DOJ, *Antitrust Guide Concerning Research Joint Ventures* (1980).

134 OECD, *op. cit.*, p. 59.

135 *Ibid.*

136 S. Oppenheim, G. Weston and J. McCarthy, *Federal Antitrust Laws* (1981), pp. 511 and 512. This is the "perceived potential entrant theory". The other aspect of the theory is the "theory of actual potential competition" according to which one or more firms on the edge of the market will actually enter the market *de novo* at some future date under favourable oligopolistic market conditions. The theory is applied whether or not the company's plans are known or perceived by market participants. See J. M. Miller, "Contractual joint ventures between partners with complementary research programs - Is the theory of potential competition available to render the agreement unreasonable under section 1?", *Journal of the Patent and Trademark Office Soc.*, vol. 68, No. 2 (1986).

137 OECD, *op. cit.*, p. 60.

138 *Ibid.*

139 Due to the more favourable attitude towards joint R and D and the traditional antitrust theories of collusion and market exclusion already available to prosecute antitrust violations of joint R and D venturers, it is possible that the theory of potential competition will not be applied in such cases. See Miller, *op. cit.*

might be necessary in a particular case for successful R and D."[140]

141. The United States Congress has also taken steps to encourage joint R and D by enacting the *National Co-operative Research Act* of 1984 (hereafter referred to as the NCRA).[141] The Act takes some steps to make joint research less risky and hence more desirable for business. It codifies the use of the rule-of-reason standard in R and D joint ventures, thus granting more certainty to firms. This standard was formerly suggested in the 1980 Antitrust Guide concerning R and D joint ventures, but it was not binding on the Justice Department or the Courts. Another important element of the law is the elimination of treble damages for anticompetitive R and D ventures registered under the Act. Moreover, the Act discourages the filing of frivolous suits by the award of attorney's fees to the prevailing party.[142] For the purposes of the Act, the term "joint research and development venture" encompasses:

(a) Theoretical analysis, experimentation, or systematic study of phenomena or observable facts;
(b) The development or testing of basic engineering techniques;
(c) The extension of investigative findings or theory of a scientific or technical nature into practical application for experimental production and testing or models, materials, processes, etc.;
(d) The collection, exchange and analysis of research information; or
(e) Any combination of (a), (b), (c) or (d).

142. Joint R and D ventures may include the establishment and operation of facilities for the pursuit of research, the conduct of such ventures on a protected and proprietary basis, and the filing of applications for patents and the granting of licences for the results of such ventures.

143. NCRA does not apply to (i) any agreement among competitors involving the exchange of information related to sales, costs, profitability, prices, marketing or distribution of any product, service or process "that is not reasonably required to conduct the research and development that is the purpose of such venture"; (ii) any agreement or conduct restricting competition among venture members with respect to producing or marketing products, processes, or services other than the intellectual property (e.g. patents) developed through the joint venture; (iii) any agreement or conduct restricting the sale, licensing or sharing of intellectual property developed outside the joint venture (i.e. background IPRs). However, certain agreements and conducts that are excluded from the application of the NCRA are not to be considered necessarily unlawful for two main reasons: (i) as courts tend to reduce the scope of *per se* antitrust violations, they might extend the application of the rule-of-reason standard that balances the pro-competitive benefits of joint R and D against the potential or actual anticompetitive effects of any such agreements; (ii) in the recently published *Antitrust Guidelines for International Operations*, the Justice Department is of the view that conduct excluded from the scope of the NCRA is not *per se* unlawful and will be scrutinized under the four-step joint venture analysis (rule-of-reason standard) as described in the said *Guidelines*.[143] Following this positive trend toward joint R and D, the 1988 *Guidelines* provide an analytical framework in the light of which the Department of Justice will determine whether anticompetitive practices may be outweighed by pro-competitive efficiencies generated through R and D collaborative efforts.[144]

144. The Guidelines reflect the changes in the economic analysis mentioned above. The Department of Justice seems to share the view that most joint ventures, whether for R and D, pro-

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[140] Antitrust Division, United States Department of Justice, *Antitrust Guidelines for International Operations*, Trade Reg. Rep. No. 24, C.C.H. (10 November 1988), p. 147.

[141] *United States Statutes at Large*, vol. 98, part 2 (1984).

[142] Katsh, "Act sets new standards for research ventures", *Legal Times*, 26 November 1984, p. 11.

[143] *Antitrust Guidelines for International Operations* (hereafter referred to as the '1988 Guide' or the 'International Guide'), Trade Regul. Rep., No. 24 (10 November 1988), p. 144.

[144] The *Guidelines* state that they "are intended to provide business engaged in international operations with practical guidance concerning the Department's internal antitrust enforcement policies and procedures", *International Guidelines*, p.2. However, one must bear in mind that the *Guidelines* express only the view of the Justice Department which is not binding and does not always coincide with the courts' decisions. Furthermore, the *Guide* does not prevent individuals from challenging collaborative agreements on antitrust grounds before courts. For a critical analysis of the *Guidelines*, see W. Fugate, "The new Justice Department antitrust enforcement guidelines for international operation", *Virginia J. of Int. Law*, vol 29. (1989), pp.295-345, and R. Shimp, "A critical review of the Justice Department's 1988 Antitrust Guidelines for International Operations", *North Carolina Journal of Int. Law and Commercial Regul.*, vol. 14 (1989), p. 287.

duction or marketing face stiff competition from foreign firms and often generate efficiencies that outweigh any threat to United States consumers. The issue running throughout the *Guidelines* is that the Department seems to be concerned only "about conduct that would likely create, enhance, or facilitate the exercise of market power where the risk of such anticompetitive harm is not outweighed by pro-competitive efficiencies. 'Market Power' for this purpose is the power of private firms to restrict output and raise price above competitive levels for a non-transitory period of time".[145] It is on the basis of this economic line of thought that the rule of reason is applied to analyse joint ventures in general, and R and D collaboration agreements in particular.[146]

145. The 1988 *Guide* envisages a four-step analysis of the joint ventures as follows: first, the Department of Justice will examine the likely effect on competition in the markets where the parties propose to operate, i.e. the markets in which the integration of the parties' operation occurs; secondly, the analysis will focus on the markets in which the parties are actual or potential competitors, i.e. the Department will ask whether there are "spillover" effects in other markets; thirdly, the Department will consider whether the joint-venture market has any vertical non-price restraints; fourthly, if the analysis under Steps 1, 2 or 3 uncovers significant anticompetitive risks, then the Department will examine the offsetting efficiencies. It will not challenge a transaction if the anticompetitive risks are clearly outweighed by efficiency benefits.

(c) The four-step rule-of-reason analysis in the 1988 Antitrust Guide for International Operations

146. The 1988 *Guide* describes a a hypothetical case to show how the four-step rule-of-reason analysis will apply with regard to R and D joint ventures. The hypothetical agreement does not seem to be covered by the NCRA since it involves the joint production of the new technology. It runs as follows: "three of the largest x-metal producers in the United States, which collectively supply 50 per cent of U.S. production, enter into an agreement with Beta Corporation, a company in the United Kingdom that is one of the largest x-metal producers in the EEC".[147] They agree to engage in joint R and D to produce x-metal from sources other than the traditionally used x-ore.[148] The agreement envisages the formation of a British company which will seek to obtain patents on any new process developed. The United States co-operation partners will get exclusive patent and know-how licences for the United States and Beta will get the same for the United Kingdom and other EEC countries. Moreover, the United States firms agree that they will not market x-metal produced with the licensed technology in Beta's territory and Beta agrees not to use it in the United States.[149]

147. The *first step* includes an analysis of the relevant markets and the identification of firms competing in those markets. In line with the legislative history of the NCRA, the Department believes "that an anticompetitive effect in an R and D market is unlikely where there are at least four other comparable R and D efforts underway or where there is a substantial potential for such efforts by firms or groups of firms included in the market".[150] However, this is not a definitive criterion since the Department believes that fewer competitors might also provide competition and, as said before, even a joint venture that includes all competitors in the R and D market might be necessary in some cases to succeed in R and D.[151]

148. As far as the technology market is concerned, if the joint R and D succeeds, the joint-venture company (as licensor) may control access to technologies that compete with technologies owned or controlled by the individual joint venture members (as licensees). The Department

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145 Remarks by Charles F. Rule (Assistant Attorney-General, United States Department of Justice) before the International Trade Sections and Antitrust Committee of the District of Columbia Bar, Washington, pp. 3, 5 and 6.

146 The 1988 *Guide* defines a joint venture as "any collaborative effort among firms, short of a merger, with respect to R and D, production, distribution and/or the marketing of products or services," 1988 *International Guide,...op. cit.*, p. 41.

147 *Ibid.*, p. 141.

148 *Ibid.*,

149 *Ibid*, p. 142.

150 In enacting the NCRA, Congress indicated that "the existence of four or more comparable R and D ventures would generally be sufficient to insulate an R and D joint venture from antitrust condemnation", *Ibid.*, p. 147 and note 236.

151 *Ibid.*, p. 147.

would, therefore, seek to determine whether the licences in such a case "would implicitly or explicitly restrict the independent pricing and output decisions of the joint-venture members with respect to competing technologies and, if so, whether the result would likely be anticompetitive".[152] The Department will probably not challenge the R and D venture if the restraint on the use of technology among the members of the joint venture relates to the technology developed by the joint venture (i.e. the joint venture members agreed not to license any person or body outside the joint venture) and the agreement does not restrict the individual members' use of any pre-existing technology.[153] Thus, the ban imposed upon the joint-venture to license the new technology to third parties is viewed as a logical restriction derived from the intellectual property rights of the technology owner or owners which are entitled to earn the maximum value inherent in the technology itself.[154]

149. The *second step* includes an analysis of other markets in which competition among joint-ventures might be affected. The hypothetical agreement contains two restrictions: (1) Beta (the British firm) has agreed not to sell x-metal produced using the new technology in the United States; (2) the parties' agreement provides the joint-venture company with past and projected price and cost data related to their production and sale of x-metal using traditional methods (pre-existing technologies). Such provision of information by competitors to a jointly owned company may have anticompetitive spillover effects in the relevant market for x-metal by facilitating collusion among the parties with respect to their price output of x-metal using existing technology. With regard to the first restraint, i.e, the restriction on Beta's sale of x-metal in the United States, the Department considers that joint-venture partners who have created a new technology may wish to control the products that incorporate that technology in order to recover as quickly and fully as possible the value of their inventive efforts. In this context, co-ordination in markets using the technology of the joint venture is viewed as an efficient way for the parties to the venture to appropriate the benefits from innovation.[155] Thus, the Department seems to be inclined to accept such restrictions unless the licence granted by the joint-venture company to the parents is used "not to convey valuable technology produced by the joint-venture, but to disguise a naked agreement to restrict competition in the sale of x-metal (that is, that the joint-venture would be used as the "hub" of a conspiracy among its members)".[156] The Department would therefore ascertain whether the elimination of competition by Beta would not create, facilitate or enhance the exercise of market power in the relevant market for the sale of x-metal in the United States.

150. The exchange of competitively sensitive price and cost data relating to current x-metal production using existing technologies might serve to facilitate collusion in the relevant market. Consequently, adequate restrictions on the transmission or use of such sensitive information are regarded by the Department as necessary safeguards to prevent anticompetitive use of such information by the joint-venture members. The fact that competitors may decide to carry out research activities through such a separate entity is one of such safeguards which may be supplemented by other measures intended to ensure that strategic information does not flow back to the joint venture members.[157]

151. Under *step three* (Vertical Restraints Analysis) the Department examines restrictions related to the use of the new technology other than the territorial ones discussed under step two. In the hypothetical case, the co-operation agreements included restraints on the ability of members to market the joint-venture technology (e.g. restrictions on licensing to non-members). The Department estimates that, as the joint-venture members are entitled to use competing technologies for the production of x-metal from alternative sources, there is no reason to believe that the said restriction would either have an anticompetitive exclusionary effect for the joint-venture parties in the relevant market, or that the Department would be concerned "about anticompetitive exclusion of competing suppliers of x-metal that do not possess the new technology produced by the joint venture, since they are not prevented from having access to the existing technologies". However, even if the new technology were to render any other x-metal technology obsolete, the exclusion of competing suppliers (non-members of the joint venture) from

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152 *Ibid.*, p. 149.

153 *Ibid.*,

154 *Ibid.*, note 239.

155 *Ibid.*, p. 150 and 151.

156 *Ibid.*, p. 151.

157 *Ibid.*, p. 152.

the use of the new technology would be regarded by the Department as a restriction "inherent in the nature of the property rights of the technology owner".[158]

152. If, after applying the first three steps of the analysis, no anticompetitive effects were likely, the Department would not challenge the joint venture. On the other hand, if the agreement has certain anticompetitive effects, it would not be automatically condemned by the Department. It would consider whether the threat of anticompetitive effects would be outweighed by pro-competitive efficiencies, such as the development of a new product or technology otherwise not available that could substantially improve the efficiency of United States firms serving United States consumers, and the benefits that could be derived from the sharing of economic risks involved in R and D or by pooling important information or complementary skills, among others.[159]

153. The positive attitude of the Department of Justice towards R and D joint ventures and the importance attached to R and D collaboration is reflected in its belief that as a "general matter, the pro-competitive benefits of joint R and D are more likely to outweigh the risk of anticompetitive harm the greater is the cost of R and D relative to a single firm's budgetary limits or the greater are the economies of scale that would be achieved through the jointly conducted R and D".[160]

154. It must be recalled, however, that the *Guide* reflects the criteria of the Department of Justice only which may not necessarily be shared by courts. In any case, the Department is urging Congress to enact important legal reforms for further encouraging joint R and D activities. In 1988, the Department recommended that Congress expand the National Co-operative Research Act of 1984 to cover joint production ventures. Thus, such legislation should extend to joint production ventures the benefits that the Act confers on joint R and D ventures, including "(i) assurance that joint production ventures will be judged under a rule of reason that recognizes all procompetitive benefits of such conduct; and (ii) the opportunity to limit possible damage exposure to actual, rather than treble, damages through prior notification to the antitrust enforcement agencies.[161]

2. *Competition policy in the European Economic Community (EEC)*

(a) Competition and R and D activities in the EEC

155. Throughout this study, mention has been made of certain provisions frequently included in R and D co-operation agreements which restrict the freedom of the parties and could also have a certain impact on the competitive position of compeititors other than the parties to the agreements. In the case of the EEC, many of these restrictions are examined by the Commission, which is the organ in charge of interpreting the provisions of the Treaty of Rome dealing with competition and implementing the competition policy of the Community. Thus, agreements relating to the joint execution or co-ordination of research projects or to joint development may fall under Article 85 (1) of the Treaty of Rome. This provision prohibits, in general, agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States, and which have as their object or effect the prevention, restriction or distortion of competition within the common market.[162] This wide formula is similar to the one embodied in the Sherman Act of the United States which bans any agreement which restricts trade. However, unlike United States antitrust law, EEC competition regulations contemplate the possi-

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158 *Ibid*, p. 154.

159 *Ibid*, p. 155.

160 *Ibid*, pp. 155 and 156.

161 Report to the OECD on United States Antitrust and Competition Developments for the Period 1 January to 31 December 1988. For comments on the existing legislative proposals to change antitrust law and intended to further mitigate the inhibitory effects of antitrust enforcement in technological collaborative ventures, see Th. M. Jorde and D.J. Teece, "Innovation and Co-operation: Implication for competition and antitrust", and J. F. Brodley, "Antitrust law and innovation co-operation", *The Journal of Economic Perspectives*, vol. 4 (1990), pp. 75-112.

162 This provision also gives examples of practices or agreements that could affect competition (e.g. price fixing, limitation or control of production, etc.) and considers any of those agreements or practices automatically void.

bility of granting exemptions to a vast range of conduct -- considered anticompetitive under Article 85 (1) -- that United States courts would not necessarily regard as being anticompetitive.[163] Basically, the Commission issues negative certificates in which it recognizes that an agreement does not fall within Article 85 (1), as well as individual exemptions in conformity with Article 85 (3) if it considers that an agreement restricts trade or competition according to Article 85 (1).

156. For an agreement between undertakings to be exempted under Article 85 (3), four conditions must be met, namely, the agreement must contribute to improving the production of goods or to promoting technical or economic progress and, if so, it must allow consumers a fair share of the resulting benefits. Besides these two positive conditions, two other negative conditions must be fulfilled: (i) the agreement shall not "impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives", (ii) it shall not "afford such undertakings the possibility of eliminating competition in respect of a substantial part of the projects in question".[164] From the beginning, Article 85 (1) has been widely interpreted by the Commission so that it applies to a vast range of co-operative agreements with the consequence that, having taken jurisdiction, it can consider the advantages and disadvantages of the individual agreements at the next stage, that of applying Article 85 (3).[165] However, soon after the entry into force of the Treaty of Rome, the Commission was faced with the question of how to exclude a number of interfirm co-operation agreements in view of the increasing importance of collaborative ventures on the one hand, and of the increasing number of notified agreements it was required to scrutinize since the early 1960s, on the other.

157. An excessively broad interpretation of Article 85 (1) meant that several agreements involving minor elements of co-operation or small or medium-sized enterprises came under the abovementioned provisions so as to bring uncertainty into minor co-operative ventures. It also implied a heavy burden for the Commission which had to examine an increasing number of agreements. Therefore, in its Announcement on Co-operation Agreements of 1968, the Commission stated that Article 85 (1) did not apply in principle to agreements having as their sole object:

"(a) The joint implementation of research and development projects;
(b) The joint placing of research and development contracts;
(c) The sharing out of research and development projects among participating enterprises."[166]

158. According to the Commissions's view, joint execution of research work or joint development of the results of research up to the stage of industrial application does not affect the competitive position of the parties.[167] The same applies to the sharing of research fields and development work if the results are available to all participating enterprises.[168] Nevertheless, the Commission adopted a rather strict approach with regard to the restrictions on the individual research of firms involved in joint R and D projects. Such commitments which limit the firms' freedom to plan their own research outside the joint projects could constitute an infringement of the rule of competition embodied in the Treaty of Rome. The 1968 Announcement on Co-operation Agreements considered also that agreements requiring parties to exploit jointly the results of research (e.g. joint manufacture of a new product) could result in a restraint of competition. A further restriction on competition is likely to occur if the granting of licences to third parties is expressly or tacitly excluded. However, the Commission acknowledged that the fact that research carried out jointly warrants "arrangements binding the enterprises to grant licences to third parties only by common agreement or by majority decision".[169] Following the 1968 Announcement and despite some drawbacks,[170] the Commission adopted positive steps for further

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163 V. Korah, *Introducción al derecho y práctica de la competencia en la CEE* (Barcelona, ED. Ariel, 1988), p. 98.

164 Exemptions are only granted if undertakings notify the Commission of their agreements and the Commission then determines whether the four conditions are met. The Decisions of the Commission are subject to the control of the EC European Court of Justice. See Articles 85 (3) and 177 of the Treaty of Rome, together with Regulation 17/62 which sets forth the procedural framework for the implementation of the provisions of Articles 85 and 86 of the Treaty.

165 D.G. Goyder, *EEC Competition Law* (Oxford, Clarendon Press, 1988), p. 151.

166 "Announcement concerning agreements, decisions and concerted practices in the field of co-operation between enterprises", *EC Of. J.*, C 75/3 (1968).

167 *Ibid.*

168 *Ibid.*

169 *Ibid.*

170 In the Henkel/Colgate and Beecham/Parke Davis decisions, the Commission interpreted the 1968 Announcement restrictively. These precedents caused players to believe that almost any R and D collaboration agreements going

facilitating interfirm co-operation in R and D to the point that Article 85 (1) no longer applies to restrictions on individual research related to a joint R and D project or to the joint exploitation of the results by partners under certain conditions. Thus, in the Block Exemption concerning R and D agreements published in the *Official Journal* in 1985 (Regulation 418/85),[171] mention is made of the categories of R and D agreements as well as the conditions under which arrangements will be exempted from the application of Article 85 (1) and the restrictions that are no longer caught by that provision. Unlike the 1968 Announcement in Regulation 418/85 it is assumed that joint exploitation of results may be the natural consequence of joint R and D.[172] This regulation was enacted in a context of increasing awareness of the fact that "although innovative efforts should be regarded as a normal part of the entrepreneurial spirit of individual undertakings, it cannot be denied that, in many cases, the synergy arising out of co-operation is necessary because it enables the partners to share the financial risks involved and in particular to bring together a wider range of intellectual and mental resources and experience, thus promoting the transfer of technology".[173]

(b) The Block Exemption on R and D agreements

159. The regulation, which entered into force on 1 March 1985 for a period ending on 31 December 1997, leaves intact the 1968 Announcement which states that co-operation agreements relating only to R and D normally do not fall under Article 85 (1), but extends this favourable treatment to R and D agreements which make provision for the joint exploitation of results.

160. The regulation covers three types of agreements concerning:

(1) Joint research and development of products or processes with joint exploitation of the results of the said R and D;
(2) Joint research and development of products or processes without joint exploitation of the results (if, exceptionally, such 'pure' R and D agreements fall within the purview of Article 85 (1);
(3) Joint exploitation of the results of prior R and D agreements between the same undertakings.

161. The notion of 'joint exploitation' includes joint manufacturing and joint licensing to third parties, but *not* joint distribution and selling. Some conditions must be met for an agreement to receive the favourable treatment envisaged under the exemption. Thus, R and D must be carried out in the framework of a defined programme and joint exploitation is only allowed where the know-how resulting from the common R and D contributes substantially to technical or economic progress and constitutes a decisive element for the manufacturing of the new or improved products.[174] This condition may, however, be difficult to implement in practice since it is for the partners themselves to assess whether the results will contribute to technical progress and, depending on this assessment, whether the agreement is covered by the Block Exemption or must be brought to the attention of the Commission in order to obtain an individual exemption. Furthermore, agreements will be subject to Article 85 (1) only if:

(1) All the parties have access to the results;
(2) Where there is no joint exploitation, each party is free to exploit independently the results and any pre-existing technical knowledge necessary therefor;
(3) In the case of specialization in the manufacturing of the new or improved products, each part has the right to distribute these products.

162. It is important to note that, unlike the Treaty of Rome, the regulations draw a distinction between horizontal and vertical agreements, granting the latter more lenient treatment. The block exemption sets out different conditions according to the competitive position of the parties:

(1) Where, at the time the agreement is entered into, any of the parties are competitors for pro-

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beyond generic research and restricting parallel research in the field of the agreement would fall under Article 85 (1) and require an individual exemption under Article 85 (3).

171 Commission Regulation (EEC) No. 418/85 of December 1984, *EC Of. J.*, No. L53/5,22 February 1985.

172 *Ibid*, recital 7.

173 *Fourteenth Report on Competition Policy*, p.38.

174 Regulation 418/85, Article 2-d.

ducts which may be improved or replaced by the results of R and D, the exemption applies only if their combined production of such products does not exceed 20 per cent of the market;
(2) Where two or more of the parties are not competitors at the time the agreement is entered into, the exemption applies irrespective of market shares;
(3) After five years of joint exploitation, the exemption continues to apply, whether the parties were initially competitors or not, *only* if their combined production for the new product does not exceed 20 per cent of the market.

The regulation reflects the concern of the Commission with regard to R and D collaboration agreements concluded between large firms competing in the same markets. By setting the said market-sharing limitation, the Commission intends to secure the existence of several independent poles of research in the Community.[175] The criteria of the Commission in this matter differ, at least on a theoretical plane, from the view of the United States Department of Justice that in its 1988 International Guide shows its readiness to accept the fact that, in some cases, joint research may be necessarily carried out by a substantial number of the competitors, if not all. Nevertheless, in practice, the Commission granted individual exemptions under Article 85 (3) to agreements involving large competitors embracing a substantial part of the relevant market beyond the percentage set forth in the block exemption.[176] The fact that only actual competitors are subjected to the market-sharing limitations reflects a change of approach on the part of the Commission which traditionally put great emphasis on actual as well as potential competition.[177]

163. Besides the conditions for the application of Regulation 418/85, Articles 4 and 5 contain restrictions and obligations that may be included in the agreements. The permitted provisions in Article 4 would normally fall within Article 85(1) but the permitted provisions in Article 5 (the so-called white list) would not ordinarily do so and are included *ex abundanti cautela*.[178]

164. The permitted provisions mentioned in Article 4 include restrictions related to individual research, field of use and territory such as obligations not to carry out independent research or enter into agreements with third parties in the field of the joint programme during its execution; in the case of joint exploitation, to obtain the contract products exclusively from other undertakings charged with their manufacture; not to manufacture or apply the contract processes in territories reserved for other parties; to restrict manufacture to one or more technical fields of use, except where parties are competitors; not to pursue an active sales policy in territories reserved for other parties for five years after the products are first marketed in the common market, provided that users and intermediaries can obtain the products from other suppliers without hindrance; communicate experience gained through exploiting joint R and D results, and grant non-exclusive licences for improvements.

165. The admissible obligations referred to in Article 5 (the white list) include obligations to communicate the technical knowledge necessary to carry out the programme; not to use the know-how received from another party except for the purpose of the agreement; to maintain in force intellectual property rights and pursue infringements; to keep know-how confidential even after the expiry of the contract; to pay royalties or render services to other parties to compensate for unequal contributions to joint research and development or unequal exploitation of the results; to share royalties received from third parties with other parties; and to supply other parties with minimum quantities of contract products and to observe minimum quality standards.[179]

166. Also spelled out in detail are the provisions which may under no circumstances be included in agreements if the parties want to benefit from the block exemption. Some of these provisions contained in Article 6 (the so-called black list) are similar or identical to those required by the Commission to be deleted in approving earlier individual requests for individual exemption. Thus, the following restrictions are prohibited:

(a) Where parties are restricted from carrying out independent R and D in an unconnected field, or field of the joint programme after its termination;

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[175] *Fourteenth Report on Competition Policy*, p.39.

[176] See, for instance, the R and D co-operation agreement between Michelin/Continental, which are important competitors on the world tyre market, *EC Of. J.*, No. L305/33 p. 39.

[177] V. Korah, *op.cit.*, pp. 185 and 196, and Vacuum Interrupters decision, of 31 December 1980 *EC Of. J.*, No. L383/1 in which emphasis was put on the likely effects of the agreement on potential competition.

[178] See Article 5(2) and 'preamble' 11 of Regulation 418/85.

[179] See 'preamble' 11 of Regulation 418/85.

(b) Where after completion of the R and D programme the parties are restricted from challenging the validity of intellectual property rights which protect background technologies that were necessary to carry out the programme or, where after expiry of the agreement, partners are prevented from challenging the validity of intellectual property rights which parties hold in the common market and which protect the result of the R and D;

(c) Where there are restrictions as to the quantity of the contract products the participants may sell or manufacture;

(d) Where the parties are restricted in their free determination of prices or discounts when selling the contract products to third parties;

(e) Where co-operation partners are restricted as to the customers they may serve, except in so far as is required by the field of use restriction;

(f) When parties are restricted from putting the contract products on the market, or pursuing an active sales policy in territories reserved to the other parties after the end of five years from the date the products were first marketed in the common market;

(g) When parties are not allowed to license the results of the R and D to third parties. Although the obligation to license to third parties only with the consent of the other parties is accepted in both the 1968 Announcement on Co-operation Agreements and the Regulation, such an obligation could lead to a policy of not licensing at all. The regulation makes it clear, however, that an agreement not to exploit the results of the R and D at all is not exempted.[180] Parties must, therefore, either manufacture themselves or license third parties to manufacture if they are to benefit from the exemption of the obligation to license third parties only with the consent of the others.[181]

(h) Where parties are required to refuse to meet demands from users or dealers established in their respective territories who would market the products elsewhere in the common market, or are required to take other measures to hinder parallel imports.

167. Finally, an opposition procedure is included whereby agreements containing restrictions not expressly exempted or prohibited by the regulation (the grey area) can be covered by the block exemption unless the Commission opposes exemption within six months. In sum, the effect of the regulation is to exempt any agreement fulfilling its conditions from the application of Article 85(1).[182]

168. Certainly, the fact that agreements contain provisions banned by the regulation does not render them automatically unlawful. Such agreements may be granted an individual exemption under Article 85(3) provided that they are reported to the Commission. It must be recalled that exploitation under the regulation includes the manufacturing of the product or even its licensing to third parties but does not embrace the provision of promotional and distribution facilities. Consequently, a substantial number of R and D co-operation agreements, particularly those providing for joint exploitation, may not meet the requirements of the Group Exemption and will, therefore, still require individual exemption.[183]

(c) Co-operation in R and D in the light of the Commission's decisions

169. The first decision in which the Commission dealt with the question of whether the competition rules of the EC applied to R and D co-operation agreements was issued in the Eurogypsum case. The Commission gave negative clearance to industry-wide co-operation in R and D within the framework of a trade association. The Commission based its decision on the generic nature of the research and on the fact that the results would be freely available to all and that independent

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[180] Article 6(g), Regulation 418/85.

[181] E.L. White, "Research and development: joint ventures under EEC competition law", *International Review of Industrial Property and Copyright Law*, ., vol. 16 (1985), p. 694.

[182] The European Court of Justice asserted that a block exemption neither establishes binding rules for the parties nor constrains them to adapt their arrangement in accordance with its terms. A block exemption merely sets certain conditions, the fulfilment of which allows the agreement not to be caught by Article 85(1), and thus not affected by the nullity provided for in Article 85(2). See *Court of Justice of the European Community*, 18 December 1986, aff. 10/86, V.A.G. France c.Magne: Gaz Pal. 1987, II, somm. 458, obs. Mauro, and Ch. Gavalda and G. Parleani, *op.cit.*, p. 398.

[183] D.G.Goyder, *op.cit.*, p. 162.

parallel R and D by participants was not proscribed.[184] Subsequent decisions of the Commission tended to interpret the 1968 Announcement restrictively.[185]

170. It is worthwhile mentioning the Henkel/Colgate and Beecham/Parke Davis decisions since the agreements scrutinized in these cases related exclusively to joint R and D. In the Henkel/Colgate case, two large manufacturers of detergents operating on a world-wide scale decided to set up a joint subsidiary entrusted with the task of carrying out research relating to detergents. The agreement enabled the two parties to have access to the results of the joint R and D on the same conditions and to use them without limitations. The arrangement did not restrict the freedom of the parties to carry out individual research but provided that each party would make available to the joint subsidiary the results of such research. The Commission considered that the agreement infringed Article 85(1), mainly for two reasons: (i) it restricted individual research since parties were bound to license the results of their own research activities related to the R and D agreement to the common entity; and (ii) the fact that parties had to communicate their results to the joint venture and that neither of them could license the results to third parties without the authorization of the partner had the effect of preventing each of the parties from securing a technological advantage over the other and thereby improving its position on the market. However, the Commission granted an individual exception under Article 85(3) on the basis that: (i) the joint research carried out by the parties might make for technical and economic progress; (ii) it contained no restrictions on either of the parties indispensable to the arrangement proposed; (iii) joint research was limited in time and scope (e.g, it was confined to specific products and objectives), whereas parties retained their freedom to carry out individual research outside the field of the agreement.

171. Similar criteria were applied by the Commission in the Beecham/Parke Davis case.[186] The agreement involved two competitors in the pharmaceutical industry whose objective was the creation of a new product for the treatment of blood circulation disorders. The joint research was implemented through joint planning of individual research and the exchange of results. The parties were entitled to apply for patents in their own names. The agreement enabled each party to receive from the other a non-exclusive royalty-free licence with full rights to grant sub-licences without restrictions (except with respect to Japanese patents).[187] Furthermore, the agreement provided that there was to be a full exchange of information on improvements in the production of the drug, as well as cross-licensing of such improvements, for a period of 10 years from the first marketing of the product by either party.[188] The Commission held that the agreement ran counter to Article 85(1) for the following reasons in particular:

(1) The agreement contained restrictions on individual research. The collaboration between the parties at every stage of R and D by means of a regular exchange of information and results implied that neither could obtain a competitive advantage over the other at any point in the innovative cycle. This was likely to occur since research in the field of the agreement was to be undertaken according to a joint programme whereby both parties had to decide "the substances to be investigated, and the resources in money and manpower to be assigned to the programme";[189]

(2) The collaboration was not limited to R and D but extended to the production stage since the parties were required to exchange information relating to improvements in the production of the drug substance for 10 years from the first marketing of the product. Both parties would,

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184 Eurogypsum decision, *EC Of. J.*, 8 (1968) 57/9.

185 Henkel/Colgate decision of 23 December 1971, *EC Of. J.*, No. L14/14 (1972); MAN/SAVIEM, decision of 17 January 1972, *EC Of. J.*, No. 31/29 (1972); Bayer/Gist-Brocades, decision of 15 December 1975, *EC Of. J.*, No. 30 (1976), p. 13; Vacuum Interrupters, decision, 20 January 1977, *EC Of. J.*, No. L43/32 (1977); Laval-Stork decision of 25 July 1977, *EC Of. J.*, No. L215/11 (1977); Beecham/ Parke Davis decision of 17 January 1979, *EC Of. J.*, No. L70/11, (1979), among others.

186 *EC Of. J.*, No. L70/11, 21 March 1979.

187 Provisions excluding licences for France and subjecting the granting of cross-licences to royalties were deleted at the Commission's request. The Commission considered that such provisions led to restrictions that were not indispensable for the attainment of the object of the agreement, *ibid.*, p. 14.

188 The Commission did not accept the provision as originally conceived by the parties, i.e. a provision that extended the agreement every time the product was marketed in a new country, since this would have the effect of restricting competition for an unnecessarily long period, *ibid.*, p. 18.

189 *EC Of. J.*, No. L70/11. Emphasis was also put on the fact that the agreement contained restrictions on the freedom of the parties to carry out individual research by including provisions to discourage the withdrawal of either of the parties from the joint programme.

therefore, have access to the same technical knowledge in the field of the project. Such a restriction would preclude each of the parties from achieving an advantage over the other if the R and D project resulted in a commercial product.[190] In the Commission's view, the agreement in question was not covered by the 1968 Announcement on Co-operation Agreements. The Notice was intended to cover agreements concerning the mere exchange of information on results or even the joint execution of research or the joint development of the results of the research but only "as long as the parties have a free hand with regard to their own research and development outside the joint project".[191]

172. Like in the Henkel/Colgate decision, despite the unfavourable view of the Commission, which deemed the agreement inconsistent with Article 85(1), an individual exemption was granted for a period of 10 years. The Commission emphasized that the product envisaged in the agreement was to be "pharmacologically and therapeutically different from all known medicines so that it was not a question of improving production of an existing product but of creating a new product. Even for companies as large as Beecham and Parke Davis" research demanding so much time and resource" had a better chance of succeeding if carried out on a joint and co-ordinated basis". In this connection, the Commission regarded the above-mentioned restrictions on individual research and the obligation to exchange the results derived from the research efforts planned in common as indispensable to the attainment of the advantages of collaborative research, which is based on close technical co-operation and mutual understanding.[192]

173. Basically, in the Henkel/Colgate and the Beecham/Parke Davis decisions, the Commission expressed its negative view with regard to practices which (i) tended to restrict or discourage individual research in the field of the agreement; (ii) imposed territorial restrictions; (iii) involved certain elements of co-operation at the production stage; (iv) involved co-operation in licensing to third parties which make the penetration of an oligopolistic market by third parties difficult (Beecham/Parke Davis)[193] The reason why the Commission has adopted such a strict approach with regard to R and D joint ventures may be found in the fact that, in both cases, the Commission had to scrutinize agreements involving large firms competing in oligopolistic markets with high barriers to entry. In any case, extrapolation of the language and reasoning contained in the these decisions was said to lead some lawyers to believe that R and D co-operation agreements going beyond the Eurogypsum model would often fall under Article 85(1) and therefore require special exemption under Article 85(3). "The loss of confidentiality and delay which this implied for research and development agreements caused some concern".[194]

174. Uncertainty was partially removed by the enactment of the Block Exemption (Regulation 418/85), which no longer considers the above-mentioned restrictions or practices as falling under Article 85(1) provided that certain conditions are fulfilled. On the other hand, though the principles contained in Regulation 418/85 appear to be clear, their practical application is not an easy matter. A complication often referred to by commentators is the application of the 20 per cent market-sharing limitation which competitors must not exceed if they are to benefit from the exemption. Thus, if the parties envisage the creation of a new product, it is difficult to determine their market share in a market that does not yet exist at the time of the conclusion of the agreement.[195] This practical difficulty, not to mention others, illustrates the complexity of implementing a competition policy aimed at preserving competition, on the one hand, and facilitating innovation, on the other.

175. In any case, the existence of the group exemption does not mean that the Commission is completely relieved from reviewing the R and D collaboration agreements. As stated before, the nature of the collaboration between parties may well go beyond the requirements of the block exemption. This is particularly true where parties are determined to carry out their exploitation

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190 *Ibid.*

191 *Ibid.*, p. 17.

192 *Ibid.*, p. 18. The Commission also stressed that joint research avoids duplication in a sophisticated field, adds to the likelihood that consumers will see quicker and better results in the form of a new product.

193 Similar criteria were also applied in another of the earliest decisions on co-operation agreements involving joint R and D. Thus, in the MAN/SAVIEM decision, though an individual exemption was granted, the Commission also considered that the practices mentioned above were inconsistent with Article 85(1). See decision of 17 January 1972, *EC Of. J.*, No. L31/29, 4 February 1972.

194 White, *op.cit.*, pp. 665 and 666.

195 S.Poillot-Peruzetto, "L'application du règlement 418/85 de la Commission relatif aux accords de recherche et de développement", *Revue trim.du droit européen* (1987), p. 496.

through collaboration in the distribution of the products representing the end results of their collaboration. Collaboration in R and D extending to distribution is of increasing importance in international trade. The Commission acknowledged the significance of such agreements and has granted individual exemptions to arrangements involving distribution.[196] Recently the Commission has also tended to exempt -- again on an individual basis -- large R and D industrial consortia formed by competitors wishing to cooperate in marketing.

176. The BP/Kellog arrangement is a good example of development agreements containing restrictions going beyond the scope of the Group Exemption (Regulation 418/85). BP had developed a catalyst for ammonia production and Kellog was a process plant contractor specializing mainly in the construction of plants for making ammonia. The agreement provided for co-operation in developing designs for the construction of an ammonia plant using BP's catalyst. BP agreed: (i) not to disclose information about the catalyst for other development projects in the field of ammonia production; (ii) not to supply the catalyst to third parties during the life of the joint development agreement without Kellog's consent, and (iii) to use its best endeavours to employ Kellog as the design contractor if the first plant to be built using the new process was built for BP. Kellog agreed: (i) not to carry out individual research in the field of the catalyst; and (ii) to inform BP before spending more money on developing certain other ammonia processes, or bidding for a plant without offering the jointly developed process. It is interesting to note that the restrictions imposed on Kellog went beyond the field of the agreement (e.g. restrictions on the development of ammonia processes other than that developed by BP or incorporating the traditional technology). In this connection, the Commission held that the restrictions on the supply of the catalyst by BP and the restrictions on the development or sale of other processes by Kellog fell under the prohibition of Article 85(1), since the freedom of commercial decision of the parties was thus restricted. Furthermore, Regulation 418/85 did not apply since some of the restrictions in the agreement related to products that had not been jointly developed (especially the catalyst, which had been independently developed by BP). Nevertheless, the Commission granted an individual exemption under Article 85(3) because the agreement was likely to promote technical and economic progress, particularly energy saving, from which consumers would benefit. In this context, the Commission was of the opinion that the said restrictions appeared reasonable and necessary to commit parties to the joint project and ensure an adequate return if research succeeded.[197]

177. Moreover, in the Continental/Michelin case, an individual exemption was granted under Article 85(3) with regard to an agreement involving two of the largest tyre manufacturers in the world with a market share far greater than the 20 per cent allowed by the Block Exemption.[198] The agreement was intended to develop a new tyre system and entailed a certain degree of specialization of the partners. Furthermore, the agreement restricted the freedom of the parties to market the new product since they were required to advise each other six months in advance of any decision to market the new tyre system, and to co-ordinate their positions in presenting the system to all official authorities and to the motor vehicle manufacturers.[199] In the view of the Commission, the agreement was likely to contribute to technical progress and benefit consumers. Particular consideration was taken of the fact that co-operation was restricted to areas directly connected with the development of the new system, while the parties otherwise remained competitors. Restrictions with regard to the freedom to market the new product were accepted on the grounds that minimum co-ordination during the initial stage of marketing and the establishment of uniform standards (which also benefit consumers) were necessary to ensure that the development work would be rewarded.[200]

178. In a recent decision (Alcatel/ANT Nachrichtentechnik), the Commission granted an individual exemption to an agreement involving co-operation between two firms in R and D activities in the space segment of communication systems using satellites and space vehicles. The agreement provided for the exploitaition of certain results and extended co-operation into marketing, the latter not being allowed by the Block Exemption. Marketing policies of the parties were to be co-

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196 See the Commission's decision of 5 December 1983 in the VW/Man case where the Commission was ready to accept collaboration in distribution if it holds substantial advantages which outweigh the restrictions on competition created by the agreement, *EC Of. J.*, No. L376/11, 31 December 1983.

197 *EC Of. J.*, No. L 369/6, 31 December 1985.

198 Continental and Michelin together had a market share of some 46 per cent in the market for tyres in the EC in 1986. See *EC Of. J.*, No. L305/33, 10 November 1988.

199 *Ibid.*, p. 38.

200 *Ibid.*, p. 41.

ordinated by a steering committee composed of representatives of both companies. It was for this committee to determine the strategy to be followed in both jointly as well as individually marketed projects (including calls for tenders), and to decide which party would be the main contractor.[201] Although the Commission found these provisions inconsistent with Article 85(1) and not covered by Regulation 418/85, an individual exemption was given. Thus, besides the two positive conditions of Article 85(3), namely, technical progress and benefit to consumers, which were deemed to be met, the Commission justified such stringent restrictions on the freedom of the parties to market the results by invoking the particular features of the relevant market. Agreements in the space segment of communication demand close co-operation among partners and a high degree of specialization. In addition, customers in this field insist on knowing, in great detail, who has manufactured which items and all the relevant details, as there is usually no way of repairing a satellite once in orbit. Competition usually takes place by customers calling for tenders, which are then submitted by consortia formed on a case-by-case basis. If separate marketing were to be envisaged, the same group of experts would be required to promote the same technical package on behalf of each of the co-operation partners (or rivals). The Commission considered that customers might have doubts as to whether the two parties, having failed to cooperate commercially on a joint bid, could in fact cooperate successfully technically. For practical reasons, therefore, it was believed that the benefits of joint R and D and joint manufacture could "only be achieved if they are combined with a degree of joint marketing".[202]

179. By means of individual exemptions granted under Article 85(3), the Commission has approved a wide range of collaboration schemes in which R and D has been coupled with joint production, distribution or even marketing. In doing so, the Commission has tended to examine whether the anticompetitive provisions of the agreement are outweighed by the advantages foreseen in Article 85(3), i.e. technical or economic advantage, improvement of production or distribution of products and consumer benefit. Such a test cannot, however, be assimilated to the rule-of-reason analysis used in the United States antitrust system. The objectives of competition policy as well as the very notion of "competition" differ in the United States from those in the EEC. To express this in a simplified way, economic analysis may be said to prevail over any other consideration in United States antitrust law, whereas the "economic test" (efficiency test) carried out by the Commission is influenced by political goals such as the integration of the economies of the EC Member States and the encouragement of collaboration among small and medium-sized enterprises across national boundaries.[203] The approach of the Community has been criticized for being too strict with regard to certain practices which may be restrictive in appearance but actually enhance efficiency and competition. Hence, practices having pro-competitive effects are, in principle, regarded as inconsistent with Article 85(1) and therefore need an individual exemption. This means that notification of an agreement must be given and that parties are uncertain about the lawfulness of the agreement until a special decision is issued by the Commission. Only an individual decision of the Commission ensures parties that their agreement will not be challenged and that the application of a new technology will not be jeopardized.[204]

180. In this connection, the European Court of Justice was ready to follow in some instances a more flexible approach closer to the rule-of-reason test used in the United States. Thus, in the Remia and Nutricia *versus* Commission and Pronuptia cases the Court held that reasonable restrictions necessary to make a pro-competitive transaction viable are not covered by Article 85(1).[205] However, this article was not always consistently interpreted by the European Court of Justice.[206] Moreover, the prevalent opinion seems to oppose the application of the rule-of-reason

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201 Alcatel Espace/ANT Nachrichtentechnik, *EC Of. J.*, No. L32/19(1991).

202 *Ibid.*, p. 25. It should be noted that the Commission also attached importance to the fact that both competitors together had a market share below the 20 per cent limit established in the Block Exemption and that significant competition was taking place in the same segment of the market.

203 See the favourable attitude towards horizontal co-operation between small enterprises in V. Sopelem/Vickers I and II. In this case, the Commission approved an agreement under which two small companies competing in the field of microscopy agreed to cooperate and exchange expertise in R and D to develop sophisticated microscopes, *EC Of. J*, No. L70, 13 March 1978, and *EC Of. J*, No. L391/1, 31 December 1971.

204 See V. Korah, "Critical comments on the Commission's recent decisions exempting joint ventures to exploit research that needs further development", *European Law Review* February 1987, p. 21. The notification procedure has been criticized as being time and resource consuming.

205 Case 42/84, Judgement of July, 1985 (1987) 1 *C.M.L.R.* 1, C.M.R. 14, 217 and case 161/84, 1 *C.M.L.R.* 414, (1986). See also Ch. Gavalda and G. Parléani, *op.cit*, p. 370.

206 See B. Hawk,"La révolution antitrust américaine: une 'eçon pour la Communauté économique européenne?" *Rev. trim. de droit européen*, 1 (1988), p. 25.

approach as conceived in United States antitrust law. Emphasis is put on the political and non-economic goals, principally the integration of markets, which call for the application of different rules and criteria.[207] In any case, the Commission and, to a lesser extent, the European Court seem to refrain from any systematization of these restrictive practices or provisions going beyond the scope of the Block Exemption which may be necessary to generate pro-competitive efficiencies. Such an approach gives them more discretion to evaluate the economic effects of the collaboration agreements on a case-by case basis.

181. Finally, account must be taken of the fact that the R and D collaboration agreements concluded within the framework of Community-sponsored R and D programmes are almost immune to competition laws, since they are part of the Community's general policy to increase European competitiviness in world markets and are, in principle, oriented to pre-competitive research.[208] Furthermore, co-operation among firms is generally carried out by means of a contract concluded with the Community and incorporating the general principles of the Model Contract.[209]

182. As stated earlier, the Model Contract is one of the policy instruments used by the Community to ensure a wide transfer of technology among the undertakings participating in any of the specific R and D programmes it sponsors. If the parties carry out research within the terms of the Model Contract their agreement will not be challenged under competition laws. However, the situation will be different if parties conclude an additional agreement intended to supplement the Model Contract and make provision for joint exploitation. In this case, the parties should notify the Commission of their supplementary agreeemnt if it contains provisions going beyond those allowed by the Block Exemption.

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[207] See G. Wills, "'Rule of Reason': une règle raisonnable en droit communautaire?". *Cahiers de Droit Européen*, , 1-2 (1990), pp. 19-74, and Hawk, *op.cit.*, pp. 5-44.

[208] See D.G. Godyer, *op.cit.*, p.173.

[209] The main principles contained in the Model Contract were discussed in chapter III, section A, when reference was made to the allocation of property rights within the framework of the ESPRIT Programme.

Chapter VI

CONCLUDING REMARKS:

THE RELEVANCE OF R AND D COLLABORATION AGREEMENTS IN DEVELOPING COUNTRIES

183. Interfirm collaboration in R and D has flourished in recent years because of the acceleration of technological innovation and the shortening of product lead-times and life cycles which have made time a critical factor to be considered. Strategic alliances between enterprises with or without support from governments may provide shortcuts for several private companies racing to improve their production efficiency, quality and performance. In addition, the convergence of technologies in what were formerly separate markets, i.e. a closer relationship among technological applications in different sectors, has made collaboration ventures even more attractive.[210] Furthermore, the rising costs of R and D, manufacturing facilities and product development constitute another incentive for enterprises to carry out joint R and D activities. All these converging factors have led companies to believe that the sharing of risks and resources is an increasingly desirable strategy.

184. However, despite the rising enthusiasm about interfirm collaboration, doubts continue to persist with regard to the capacity of collaborative ventures or "strategic alliances" to increase competitiveness. There is a wide range of opinions. Collaboration between enterprises in general is favoured by most commentators. Some authors vigorously favour flexible forms of collaboration as an adequate way to overcome rising costs and to strengthen the individual competitive position of each of the partners.[211] Others believe that competitive gains may accrue to the parties to an alliance, provided that the following conditions are met: (i) the partners' strategic goals converge while their competitive goals diverge; (ii) the size and power of both partners is modest compared with industry leaders; (iii) each partner believes it can learn from the other and at the same time limit access to proprietary skills.

185. The challenge, in such a case, would be to share the necessary skills "to create advantage*vis-à-vis* companies outside the alliance while preventing a wholesale transfer of core skills to the partners".[212] In this context, enterprises could have access to new skills while avoiding exclusive reliance on the outcome of the collaborative undertaking.

186. However, in some cases, enterprises undertaking joint R and D may disclose part of their background information in situations in which they could develop the new product themselves by merely getting the complementary skills they need to develop a new product through licensing agreements.[213] Moreover, diversity in research projects provides an important hedge against the possibility that any single research project will be fruitless. Heavy reliance on collaboration research may reduce the diversity of research projects in a sector or technology, diminishing the productivity of the longer research effort.[214] In some instances, R and D cooperation may only be an ancillary part of a broader arrangement in which the "alliance" is merely conceived of as a tool of convenience to take advantage of the relaxation of antitrust laws in some developed countries. For instance, R and D foreseen in the agreement as being of secondary importance may,

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210 As Marton indicates, ".... in the textile industry, for example, a large proportion of synthetic materials are manufactured from chemical derivatives by companies reducing chemicals. Consequently, some corporations, such as Imperial Chemical Industries in the United Kingdom, have become involved in the production of synthetic fibres, while some chemical companies have developed close technological linkages with major manufacturers of synthetic materials". K. Marton, *Multinationals, Technology and Industrialization. Implications and Impact in Third World Countries* (Lexington, 1988), pp. 62 and 63. See also K. Venkataraman, "Management of technological change", *Industry and Development*, No. 26 (UNIDO, 1989), p. 71.

211 Ohmae vigorously supports interfirm collaboration on a flexible non-equity basis. See Ohmae, *op.cit.*, pp. 143-154.

212 See I.L. Hamel, Doz and Prahalad, "Collaborate with your competitors and win", *Harvard Business Review*, (January-February 1989), pp. 135 and 136.

213 For a vigorous warning about the dangers of collaboration, see Reich R. R. Reich, and Manking, "Joint ventures with Japan give away our future", *Havard Business Review* (March-April 1986), pp. 78-86.

214 Mowery and Rosenberg, *op.cit.*, p. 240.

in fact, disguise an exclusive distribution agreement whereby one of the partners may constitute the only supply source of the other partner's products in certain markets.[215] It has been argued that the multiplication of collaboration agreements involving joint R and D between Japanese companies and European or United States firms in the 1980s is not motivated by the wish to create new technologies. Rather, the joint R and D appears in those agreements as a secondary element of a wider marketing or production strategy of the corporations involved.[216] However, pure R and D cooperation agreements between firms are exceptional and in general such contracts provide for a varying degree of cooperation in licensing, exploiting or distributing the results of the research.

187. As far as public-sponsored R and D programmes are concerned, some criticism has also been raised. It has been said that some virtues of EEC-sponsored R and D programmes, such as the creation of dynamic technological linkages and the intensive exchange of information among European companies, seem to be overshadowed by the existence of serious doubts, even among the companies involved, "about how much of value they have contributed to innovation". It has also been argued that "for many companies, the attraction of such schemes appears to have much to do with the cheap finance and privileged access to policy-making which they offer."[217]

188. Similar remarks have been made with respect to the Japanese cooperative research projects sponsored by the Ministry of International Trade and Industry (MITI). It has been argued that "Japanese companies participate in MITI Projects to maintain good relations with MITI, to preserve their corporate images, and to hedge the risk that competitors will gain from the project -- largely defensive reasons. Companies rarely contribute their best scientists and engineers to cooperative projects and usually spend much more on their own private research in the same field".[218] All these factors may explain why Japan's government-supported cooperative research has gradually shifted to more basic research, the Governemnt's own financial contribution to such research being very modest. In this context, Japanese R and D programmes seem to be designed "to signal the importance of emerging technical areas and stimulate proprietary firm research, not to achieve efficiencies in R and D".[219]

189. In any case, it should not be asserted that collaborative ventures are good or negative *per se*. In fact, private companies increasingly view alliances as a source of valuable information and as a means of discovering the complementary capabilities they need to develop new processes or products. Thus, diversification in information sources is desirable for many firms, because it increases the probability of receiving the required information. After collaboration, partners may therefore have improved their competitive position.[220]

190. As stated earlier, the R and D collaboration agreements examined in this work differ from the earlier generation of "traditional joint ventures" among firms from OECD countries and with the so-called "new forms of foreign investments" which took place in developing countries in the 1960s and 1970s (e.g., licensing and know-how agreements, turnkey contracts, joint ventures). On a North-South dimension, cooperation between supplier and acquirer is usually directed to aspects related to the proper implementation and absorption of the technologies, but does not embrace the creation of a new product or process. However, what actually distinguishes an R and D collaboration agreement from the above-mentioned forms of transfer of technology is the fact that cooperation partners are both acquirers and suppliers of technology. The barter of technological information and knowledge based on reciprocity is therefore institutionalized by means of a con-

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215 This was the case of the Siemens/FANUC collaboration agreements. The joint R and D activities envisaged between these two competitors in a series of cooperative agreements resulted in a commercial failure and Siemens became the exclusive distributor of FANUC's NCs (Numerical Controls) within the Community, depriving the Common Market of a cheaper source of a product that was essential for the development of a major community industry. See European Commission's Decision of 18 December 1985 relating to Article 85 of the EEC Treaty, *EC Of. J.*, No. L376/29.

216 See J. Jehl, *Le commerce international de la technologie. Approche juridique* (Paris, Libraries Techniques 1985), pp. 209 and 210.

217 See, "Power failure in high-tech", *Financial Times*, 25 October 1990, and "Giving direction to the single market", *Financial Times*, 22 October 1990. See also L. Turner, *Industrial Collaboration with Japan* (London, Royal Institute of International Affairs, 1987), p.110. Turner considers such European Programmes as a subsidy for the emerging "European Champions" which may lead to the spending of disproportionate sums to prop up the least efficient companies.

218 M. Porter, "The competitive advantage of nations", *Harvard Business Review* (March-April 1990), p. 88.

219 *Ibid.*, (London, The Macmillan Press Ltd., 1990), p. 636.

220 With regard to the propensity of firms to collaborate and the gains that may be obtained through international collaboration in advanced technology, see J.B. Tucker, "Partners and rivals: a model of international collaboration in advanced technology", *International Organization*, 45 (1991), pp. 83-120.

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191. There is evidence to confirm that technological cooperation is principally taking place among enterprises in developed market-economy countries, and particularly in high-technology sectors.[221] The wave of strategic alliances comprising R and D cooperation does not so far extend to any significant extent to developing countries' enterprises. In this context, interfirm cooperation in R and D undoubtedly constitutes an important channel for the transfer of technology among the firms concerned and may lead to an increase in the sources of technology in the home countries of such companies. However, the long-run effects for the enterprises of developing countries not taking part in the complex network of strategic alliances are uncertain. Still, in the short run, the sources of technology for developing country enterprises may decrease, particularly in the case of enterprises for which the sources are already limited.[222]

192. The fact that such strategic alliances take place mainly in the industrialized world reflects a clear trend which started in the late 1970s, namely, the relocation of most foreign direct investment in developed countries as a consequence of the increasing use of new technologies and new materials. New technologies bring about significant manpower and energy savings.[223] Moreover, new materials (e.g., composites, ceramics, new metal products), besides enhancing manufacturing flexibility and improving performance, also make the industrial sectors of developed countries less reliant on raw materials which are, to a large extent, produced in developing countries. In such a context, comparative advantages of developing countries based on the production of natural resources or the existence of cheap labour are no longer key factors that may influence the investment decisions of foreign investors or transnational corporations. Unless developing countries increase their "potential for assimilating technological innovation and for rallying the requisite brainpower" their capacity to attract foreign direct investment will be permanently reduced.[224] The same could be said with respect to the enterprises from developing countries. It will be increasingly difficult, if not impossible, for enterprises from developing countries to take part in the network of strategic alliances unless they gradually become able to absorb the new technologies and develop the complementary skills or technologies they might offer in exchange for new knowledge developed by OECD firms. One factor that has blocked the participation in such ventures of enterprises from newly industrialized economies (NIEs) (e.g. Taiwan Province of China, Singapore, Thailand, Malaysia or the Republic of Korea) has been "their firms' limited expertise in state-of-the-art technologies like superconductivity, optoelectronics, vacuum microelectronics, etc."[225]

193. It should be noted that, in terms of technology access, enterprises from developing countries and even from the NIEs face a hostile environment for the following reasons:

(1) The possession of complementary assets (mainly complementary knowledge or technologies to be exchanged with other companies' background knowledge) seems to be increasingly necessary for enterprises to have access to the new processes or knowledge developed by firms from industrialized countries. Given the technological asymmetries between most firms from developing countries and their counterparts in the industrialized world, it is not easy to predict how much potential exists for developing country firms to attract strategic partners.

(2) Even nations are compelled to possess complementary knowledge or technologies ready to be shared with foreigners for their enterprises and nationals to be entitled to have access to foreign government-funded technologies. Increasing global competition has led some countries

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221 See annex.

222 See the UNCTAD (TD/CODE TOT/55), *op. cit.*, paras. 26 and 82.

223 The combination of microprocessors and computers has contributed to the development of robotics and automation. In turn, the introduction of robots and computer-assisted design and manufacture systems into the productive systems has led to considerable manpower savings. See OECD, "International direct investment and the new economic environment" (Tokyo Round Table, Paris, 1989), p. 102. The international flow of technology decreased in the 1980s, also partly due to declines in developing Africa and America and could be linked to the unstable and stagnating macro-economic environment, largely generated by the decline in capital flows and increased financial outflows to meet debt obligations. See UNCTAD, "Transfer and development of technology in a changing world environment: the challenge of the 1990s" - *report by the UNCTAD secretariat* (TD/B/C.6/153), 25 January 1991, p. 2.

224 OECD, "International direct investment and the new economic environment", *op. cit.*, p. 112. As indicated in a recent UNCTAD study, one of the obstacles to the diffusion of computer-aided design systems or numerically controlled machine tools in developing countries is the lack of skills to use such technologies. See "The diffusion of electronics technologies in the capital goods sector in some developing countries" - *study by the UNCTAD secretariat* (UNCTAD/ITP/TEC/10).

225 See Ernst and O'Connor, *op.cit.* (Paris, 1989), p. 78.

to adopt restrictive policies in respect of the diffusion of government-funded technologies to foreigners. Thus, foreigners' access to government-sponsored research seems to be increasingly conditioned by what their corresponding governments may offer in return. In other words, the relationship between what a government provides to other nations in terms of government-funded technology and what it receives in return should be balanced and symmetrical. This principle, which is reflected in the *Omnibus Trade and Competitiveness Act of 1988* of the United States (the so-called Symmetrical Access Clause), is perceived by policy-makers as entirely appropriate in the light of today's environment of intense global economic competition.[226]

(3) The strengthening of the international protection of intellectual property in line with the level of protection usually granted by the most advanced countries is likely to restrict the access of developing countries' firms to core technologies developed by companies from developed countries. This reinforcement of protection is being promoted by industrialized countries -- led by the United States -- which intend to implement it through both bilateral and multilateral actions, especially in the framework of the negotiations on TRIPs (trade-related aspects of intellectual property rights) in the Uruguay Round. Industrialized countries intend basically to establish a universally applicable set of "minimum" standards that States would have to apply irrespective of their degree of development.[227] Should firms from the industrialized world become excessively protective of their inventions, know-how and design capabilities owing to calculated measures undertaken within an international legal framework that does not consider development disparities to be relevant, it might become increasingly difficult for firms from developing countries to pursue reverse-engineering strategies.[228]

(4) The tendency to "privatize" the results derived from basic or fundamental research (still carried out substantially by the academic sector) constitutes an added constraint on developing countries' firms and academic sectors whose access to scientific knowledge could be further restricted as a result. As differences between basic and applied research become blurred and IPRs are considered one of the main business assets, universities and research centres are also increasingly willing to reap the benefits of their research results. It has been argued that "IPR and its ownership is therefore a live and relatively recent issue for negotiation in university/industry contracts. In the past, industry has expected that it would own any technologies or IPR arising in university research which they may fund (even when only partially funded). Universities no longer accept this position and the issue is an increasing area of conflict in contract negotiation".[229] One-way technology transfer, from the university to the firm, has been replaced by a two-way exchange of technological knowledge between the university and the firm[230] This market-oriented approach embraced by universities may end up restricting the participation of foreign scientists in certain conferences or workshops, further limiting the circulation of research results regarding "strategic" knowledge or technologies.

(5) The joint R and D programmes (e.g. ESPRIT) currently under way in Europe remains, in principle, off limits to outsiders and the various research consortia in Japan and the United States have similar *de facto* rules of exclusion.[231]

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226 See testimony of T. Murrin, Deputy Secretary of Commerce before the Subcommittee on International Scientific Co-operation of the Committee on Science, Space and Technology United States House of Representatives, one hundred and first Congress, first session, 19 July 1989, No. 70 (Washington, D.C., U.S. Government Printing Office, 1990), p. 9.

227 With respect to the implications for developing countries of the strengthening of the international protection of IPRs, see UNCTAD, *Trade and Development Report, 1991* (United Nations Publication, Sales No. E.91.II.D.15), chap. III, pp. 179-194, in particular pp. 190-193.

228 In practice, even throughout the industrialized world, companies rely on reverse engineering for competitive purposes and they should be allowed to do so. In a similar sense, see A. Staines, "Copying and competition: Industrial aspects. Paper presented at the Conference on *Copying Without Infringing: Living with Other People's Intellectual Property Rights* and organized by the European Study Conference Limited (ESC), held in London on 24 and 25 October 1991.

229 I.A. Weaver, "Intellectual property and university research", *World Patent Information*, vol. 12, No. 4 (1990), p. 198. See also W. Mitchell, "Using academic technology: Transfer methods and licencing incidence in the commercialization of American diagnostic imaging equipment research, 1954-1988", *Research Policy*, vol. 20 (1991), pp. 203-216.

230 See "Beyond the Rhetoric: Evaluating University - Industry Co-operation in Research and Technological Exchange", *A Report by the Business-Higher Education Forum*, vol. I p. 17 (Washington, D.C., May 1988).

231 Ernst and O'Connor, *op. cit.*, p. 78. The participation of non-Community undertakings in Community R and D programmes is only possible by virtue of a special authorization by the Council of the EC or a framework agreement on co-operation in science and technology concluded between the EC and a non-EC Member State. Such a framework agreement may entitle enterprises from a non-EC Member State to participate in certain R and D projects

194. Such a protectionist environment renders technological cooperation among developing countries more necessary than in the past. Therefore, the importance of R and D collaboration agreements as channels for the transfer of technology among enterprises in developing countries should not be overlooked. Although technological progress tends to save on inputs that are abundant in many developing countries, there is nevertheless some room for fruitful interfirm co-operation -- in both a north-south and south-south dimension -- that should be explored by policy-makers and enterprises from developing countries.

195. Governments of developing countries can no longer rely exclusively on transfer of technology legislation to influence the terms of such transfer and to strengthen the bargaining position of their domestic firms. Similarly, developing countries' firms cannot confine their research efforts to the imitation or adaptation of products or processes (catch-up strategies). The trend towards the reinforcement of the protection of intellectual property at the domestic and international levels renders such strategies more difficult, particularly if they are not supplemented by domestic R and D programmes and initiatives leading to the enhancement of the absorption capabilities of the industry.[232] To the extent that such local innovative activity does not materialize, increased intellectual property protection could simply make it easier for firms from industrialized countries to maintain a presence in developing country markets by exporting from their home bases rather than having to undertake foreign direct investment or conclude collaboration agreements to protect market shares in those countries.

196. In contrast, if developing countries tend to upgrade the absorption capabilities of their industries and to develop certain design and manufacturing capabilities, technological cooperation with firms from industrialized countries may be possible.

197. Technological asymmetry is not always an impediment for interfirm technological collaboration. There are some examples of "tactical", if not strategic, collaboration between firms in the Republic of Korea and the United States semiconductor firms, in which the former offer their low-cost manufacturing excellence and the latter their design know-how. Both groups of firms see such a combination of capabilities as a way of successfully competing with Japanese semiconductor giants. In addition, the South Korean firms perceive such collaboration as a point of entry into more sophisticated chip markets.[233] This example shows that interfirm collaboration may, under certain conditions, constitute a significant channel for the transfer of technology among enterprises and a way for developing country firms to proceed to more sophisticated forms of cooperation beyond licensing or sub-contracting.

198. New biotechnologies also offer a potential field of cooperation between research centres and enterprises in both a north-south and south-south dimension. A recent study by the UNCTAD secretariat has shown that "the extent of progress achieved in applying the various biotechnological techniques to agriculture is uneven and still rather short on actual results".[234] Moreover, unlike chemical or engineering developments, advances in agriculture are not readily transplanted from one locale to another without considerable adaptive R and D efforts. Investment and active engagement in adaptive R and D to find commercial applications of biotechnical innovations in agriculture may offer a great opportunity to developing countries to expand their food production base without compromising sustainability. It might also contribute to improving their export revenues.[235]

199. The challenge for governments is to mobilize the international cooperation and encourage R and D collaboration to the extent necessary to seize these opportunities. There are some

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carried out within Community programmes. So far, no framework agreement has been concluded with developing countries. See Article 14(10), Model Contract (Annex II - General Conditions) and the Commission's Communication on "Cooperation in science and technology with third countries", *COM(90)256 final*, Brussels, 13 June 1990. In addition, in Japan, BASF has recently become the first foreign company to participate in a government-supported R and D programme, See Ch. Dörrenbächer and M. Wortmann, "The internationalization of corporate research and development", *INTERECONOMICS* (May/June 1991), p. 144.

232 See E. White, "Politicas e instrumentos para el desarrollo de las nuevas tecnologias en América Latina" in *El derecho y las nuevas tecnologias* (Buenos Aires, Ediciones Depalma, 1990), p. 644; and H. Blanco, "Global competition and special challenge of developing countries", in *Cooperation and competition in the global economy*, A. Furino (ed.) (Cambridge, Ballinger Publishing Company, 1988), pp. 245-254.

233 See Ernst and O'Connor, *op. cit.*, p. 79.

234 See "Trade and development aspects and implication of new and emerging technologies: the case of biotechnology" *report by the UNCTAD secretariat* (TD/B/C.6/154), 11 March 1991, p. 6.

235 *Ibid.*, pp. iv and v, paras (v) and (xi).

promising cooperation initiatives at the international level which could pave the way for other forms of collaborative research involving the private sector in both the industrialized and the developing world. Thus, international cassava research is being co-ordinated by the Centro Internacional para Agricultura (CIAT) in Colombia, while the International Institute for Tropical Agriculture (IITA) has regional responsibility for Africa. CIAT's research targets, which were jointly set by Latin American and African scientists, involve the development of varieties resistant to mosaic virus and development of transformation and regeneration systems for transgenic plants.[236] Another interesting example is the binational research programme in the field of biotechnology launched by Brazil and Argentina in the framework of the integration process started in 1986. A binational centre (Centro Argentino-Brasileño de Biotecnologia (CABBIO)) has been established to support and co-ordinate R and D projects involving research centres or enterprises of both countries.[237]

200. Potential technological collaboration between small and medium-sized enterprises (SMEs) from industrialized countries, on the one hand, and large and well-established corporations or SMEs from developing countries on the other, should also be considered. There are many innovative and dynamic SMEs from developed countries, which could offer their know-how in exchange for expertise in adaptation R and D and familiarity with the domestic market of some large firms in developing countries. The latter could also help to offset the inability of SMEs to penetrate foreign markets by offering some access to their distribution networks in the domestic market. Furthermore, biotechnology-based SMEs from both industrialized and developing countries may have converging interests in carrying out joint R and D, since a relatively small amount of capital is needed to launch a joint-venture operation.[238] In any case, SMEs are usually more open to the kind of technology transfer schemes that developing countries' firms would expect. As one study has revealed, SMEs from industrialized countries seem to be less predisposed to full or majority ownership in developing countries than large transnational corporations.[239] Technological collaboration on a non-equity basis is, therefore, more likely to take place with SMEs than with large firms. A development that might be financially and technologically beneficial for SMEs in both industrialized and developing countries would be the establishment of networks of such firms in different countries that may then be able to interface with similar networks elsewhere. For instance, trade associations of specific sectors in an industrialized country and a developing country might establish communication channels which could facilitate technical cooperation between members of the two associations. Some such links have already been established between firms from the Republic of Korea and Germany.[240]

201. The regional integration efforts recently undertaken by some developing countries offer further possibilities for the formation of such networks of firms and the expansion of interfirm R and D collaboration at a regional level.[241] There is a considerable degree of commonality in the

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236 CIAT is also carrying out joint research with the International Potato Research Center (CIP) and Louisiana State University, with a view to introducing the potato's gene for protein storage into cassava. *Ibid*, paras. 55 and 56.

237 See White, "Politicas e instrumentos para el desarrollo de las nuevas tecnologias en América Latina", *op. cit.*, p. 670. See also *Biotechnology in Europe and Latin America. Prospects for Co-operation*, B. Sorj et al., (eds.) (Dodrecht, Kluwer Academic Publishers, 1989) and the final report on work undertaken on behalf of the Commission of the European Communities by Biotics Limited relating to the "Collaborative exploitation of biological resources in the African region", 2 November 1988, in which mention is made of other cooperative initiatives involving research institutions and enterprises from industrialized and developing countries. For a warning about the dangers and challenges with which developing countries are confronted as a result of the emergence of biotechnologies, see J. de Souza Silva, "Science and the politics of genetic resources in Latin America" in *Environment and Development in Latin America. The Politics of Sustainability*, D. Goodman and M. Redclift (eds.) (Manchester University Press, 1991), pp. 79-96.

238 See "Biotechnology in Latin America", *op. cit.*, p. 222.

239 F. White and J. Campos, *Alternative technology sources for developing countries: the role of small and medium-sized enterprises from industrialized countries* (Buenos Aires, Centro de estudios de desarrollo y relaciones económicas internacionales, 1986), see particularly chap. V, pp. 103-138.

240 Ernst and O'Connor, *op cit.*, p. 131.

241 There is, for instance, the Bolivar Programme on Regional Technological Integration and Industrial Innovation and Competitiveness to be launched in 1992 by the Latin American States. This programme is intended to "contribute to a regional strategy that will surmount the barriers between countries and those that still separate research centres from production companies. It will encourage intensive industrial technological cooperation between companies and research centres of different countries of the region, facilitating an increase in the productivity and competitiveness of Latin American and Caribbean industries and economies in the regional and world markets". See SELA (Latin American Economic System) document on the Bolivar Programme SP/CL/XVII.0/Dj No. 15, XVII Regular Meeting of the Latin American Council, Caracas, Venezuela, 1 to 6 September 1991. Furthermore, the Association of South East Asian Nations (ASEAN), composed of Thailand, Malaysia, Singapore, Indonesia, Philippines and Brunei

development problems faced by developing countries, especially at the regional level, which renders co-operative problem-solving endeavours and arrangements for sharing experience a recommendable strategy.[242] Agreements whereby enterprises undertake to combine complementary capabilities to solve technical problems, to find new uses or to improve existing products or processes may contribute to enhancing productivity and rationalizing production. The enhancement of productivity that could be achieved through greater technological ties between firms would not only be beneficial for the regional market but might also serve as a jumping-off point for entry into the international market. Active integration into world markets is, in fact, the new orientation of the integration processes in some developing regions.[243] Furthermore, tighter technological links between firms in developing regions might also help them to increase their bargaining power *vis-à-vis* their counterparts in the industrialized world when it comes to negotiating transfer of technology agreements.

202. Should governments or corporate managers in developing countries be interested in encouraging interfirm R and D collaboration, due account must be taken of the legal issues discussed in this report.[244] When promoting joint R and D programmes, governments should try to strike a balance between the appropriability concerns of firms (protection of IPRs) and the general interest of society in the divulgation of new knowledge. R and D collaboration agreements are difficult to negotiate and implement because they involve a barter of the background knowledge in the possession of each partner. Any transaction for technological collaboration/transfer is, in fact, a transaction in intellectual property rights. Hence, difficult questions must be tackled by cooperation partners. As stated earlier, one of the most complex issues is to define whether and to what extent preliminary disclosure of existing background knowledge between parties or from third parties is required to enable cooperation partners to make their contribution to the venture. Well-defined use and disclosure prerogatives are of the utmost importance. Ownership, protection and exploitation of the results of the research are also crucial elements of R and D collaboration agreements. National legislations are far from offering a uniform picture with respect to such questions. Some legislations have not yet been satisfactorily developed to cope with the legal issues arising from technological co-operation between firms (co-ownership of inventions, anticompetitive clauses, etc.). Consequently, it is extremely important for the co-operation partners to determine how the results of the research are to be protected, managed and exploited.

203. Provided that governments of developing countries tend to adopt, as far as possible, vigorous technology policies facilitating the creation of technological links among their firms at national and regional levels, R and D collaboration agreements might constitute an important mechanism to facilitate the transfer of technology between enterprises, while also contributing to both the technological upgrading of industries in developing countries and the surmounting of the barriers set up in an increasingly protectionist technological environment.

Daressalam, co-ordinates a substantial part of regional co-operation programmes in science and technology through a special Committee on Science and Technology (COST). The programmes co-ordinated by COST are mainly oriented to improve the technological capability of S & T on the supply-side. See N. Kayar, "The perspective of technological capability in Asean regional S & T co-operation", paper presented for the Workshop on S & T Development in ASEAN countries, held in the Asian Institute of Technology, Bangkok, Thailand, 7 and 8 June 1990. ASEAN countries also included a Basic Agreement on ASEAN Industrial Joint Ventures in 1983. This agreement provides a framework for industrial cooperation in the ASEAN private sector. The Basic Agreement and its modifications have been reprinted in *International Legal Materials*, vol. 22, No. 6 (1983) and vol. 27, No. 3 (1988).

242 OECD, *Managing technological change in less-advanced developing countries* (Paris, 1991), p. 17.

243 See L. Mármora and D. Messner "La integraci n de Argentina, Brasil y Uruguay: concepciones, objetivos, resultados", *Comercio Exterior*, vol. 41, No. 2 (Mexico, February 1991), p. 156; and Ernst and O'Connor, *op. cit.*, p. 95.

244 See chaps. III, IV and V.

ANNEX

Data bases on interfirm co-operation

1. One of the most comprehensive data bases concerning interfirm co-operation has been provided by the FOR Corporate Strategy Research Centre at the Montedison group in Milan, Italy. It has been processed by Ricotta[1] and it includes information on 1,883 co-operation agreements concluded between 1 January 1982 and 31 December 1985 in "the more industrial countries" and some South East Asian newly industrialized countries plus China. Co-operation agreements with firms in Eastern Europe and developing countries are excluded. From a legal point of view, FOR identifies two types of non-equity agreements and three forms of agreement that involve equity. The non-equity agreements are as follows:

(i) traditional one-way licensing agreement (type I), and
(ii) complex "two-way" or "several ways" technology exchange, pooling or sharing agreements (type II).

2. On the other hand, the three forms of agreement involving equity are the following:

(i) venture capital type equity,
(ii) corporate joint ventures, and
(iii) industrial consortia.

Table 1

Interfirm agreements: Legal forms, 1982 - 1986

Legal form	Number	Percentage
Non-equity agreement	572	50.9
Type I	131	13.6
Type II	441	37.3
Agreement involving equity		
Joint ventures	242	28.4
Equity participation	95	13.7
Consortia	56	7.0

3. Table 1 clearly shows that non-equity co-operation agreements are preferred to agreements involving the creation of corporate joint ventures or equity participation. Almost 40 per cent of the 1,883 agreements involve a two-way (or several ways) technology exchange on a

1 E. Ricotta, *Accordi di Collaborazione: Strumenti Flessibili per Strategie Globali*, FOR/START (Rome, 1987).

non-equity basis. Table 2 shows in more detail the importance of non-equity agreements involving technology exchange or sharing (agreements of type II) in specific sectors.

Table 2

Interfirm agreements: Legal forms, 1982 - 1986

Legal form	Electronics	Pharm.	Autom.	Food	Total
	(Percentages)				
Non-equity agreements	55.1	66.1	66.2	47.4	50.9
Type I	13.1	25.5	21.9	15.8	13.6
Type II	42.0	40.6	44.3	31.6	37.3
Joint ventures	29.6	23.2	27.0	44.7	28.4
Equity participation	7.4	9.9	12.7	7.9	13.7
Consortia	7.9	0.7	2.1	-	7.0
Total %	**100**	**100**	**100**	**100**	**100**

4. Ricotta has also examined the agreements in terms of the main objectives stated in each one, acknowledging, however, that many agreements may be regarded as "complex" since they involve several objectives simultaneously. A distinction is thus drawn between "simple" and "complex" agreements (table 3).

Table 3

Interfirm agreements: General objectives, 1982 - 1986

General objectives	Number	Percentages
Simple agreements	1 500	79.6
Technology transfer	251	13.3
R & D integration	363	39.3
Production integration	370	19.7
Supply agreements	121	6.4
Marketing	311	16.5
Others	84	4.4
Complex agreements	383	20.4
of which:		
2 + 3	100	5.4
2 + 5	59	3.1
3 + 5	72	3.8
2 + 3 + 5	38	2.0
1 + 3	22	1.2
Other combinations	92	4.9
Total	**1 883**	**100**

5. It is interesting to observe that almost 40 per cent of the 1,883 co-operation agreements examined involve R and D integration. However, the largest category of the "complex agreements" integrates R and D and production.

6. Ricotta has also attempted to break down the agreements by sectors. It has been found that 53 per cent of the co-operation agreements analysed are concentrated in information technologies, electronics and pharmaceuticals.[2] However, the importance of the breakdown by sector should not be overemphasized since "one single agreement in aerospace may involve financial over-expenditure by firms (and often by governments) of a magnitude larger than those of all agreements in some other sectors taken together"[3]

7. The breakdown offered by FOR regarding the geographical distribution of co-operation agreements (table 4) shows that up to 1986 inter-area agreements, i.e. trans-oceanic arrangements involving "triad" firms, were more significant in numbers than intra-area agreements. However, some R and D programmes aimed at promoting R and D co-operation among European enterprises like EUREKA or ESPRIT may reverse, at least partially, the tendency of European companies to co-operate with Japanese or United States companies.[4]

Table 4

Interfirm agreements:
Geographical distribution, 1982 - 1986

Geographical areas	High-tech. industries		All industries	
	Number	%	Number	%
Intra-area				
US	254	23.9	352	18.7
EEC	150	14.1	282	15.0
Japan	18	1.7	59	3.1
inter-area				
US-EEC	276	26.0	413	21.9
US-Japan	141	13.3	202	8.6
EEC-Japan	87	8.2	162	10.8
With other areas	135	12.8	413	21.9
Total	**1 061**	**100**	**1 883**	**100**

Source: FOR, Ricotta, *op.cit.*, p. 26.

8. The ARPA DATA BASE[5] offers interesting findings in the field of information technologies. First, it shows that inter-area co-operation is more significant than intra-area co-operation. Secondly, only 201 of 2,014 interfirm agreements concluded between 1980-1986 involved partners of the "Triad" co-operating with firms of developing countries (i.e North-South Agreements). Furthermore, there are only eight agreements between partners not belonging to the "Triad". Thirdly, up to 1986 in a North-South context, corporate joint ventures and licensing agreements were the legal forms most frequently resorted to, whereas in the "Triad" industrial consortia involving joint R & D were the most usual form of co-operation.

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2 E. Ricotta, *op.cit*, p. 20.

3 Chesnais, *op.cit*, p. 67.

4 See Chesnais, *op.cit*, p. 69 and Ph.Brailland and A. Demant, *"EUREKA et l'Europe technologique"* (Paris, Libraire Générale de Droit et de Jurisprudence, 1991).

5 ARPA DATA BASE: G.C. Cainarca, M.G. Colombo, S. Mariotti, C. Ciborra, G. de Michelis and M.G. Losano, *Tecnologie Dell'Informazione E Accordi Tra Imprese* (Fondazione Adriano Olivetti, Edizioni di Comunité, Milan, 1989), p. 107, in Ph. Gugler, *Les alliances stratégiques transnationales"* (Fribourg, Switzerland, Editions universitaires, 1991), p. 196.

Table 5

**Interfirm agreements:
Legal forms and geographical distribution in the
field of information technology**

Geographical areas	Legal forms								
	CVC (1)	CJV (2)	CONS. (3)	TRANS. (4)	SC (5)	LIC. (6)	SA (7)	Others	Total
North America	48	57	157	11	13	98	100	62	546
Europe	30	46	64	1	0	18	10	14	183
Japan	4	49	50	1	4	10	7	5	130
North America - Europe	30	83	98	5	4	75	45	35	375
North America - Japan	20	90	73	13	8	116	81	28	429
Europe - Japan	8	25	24	3	0	35	25	9	129
North America - Europe - Japan	2	4	7	0	0	1	0	0	14
North America - Others	4	37	8	0	4	26	4	8	91
Europe - Others	2	19	5	1	0	12	2	5	46
Japan - Others	1	26	7	4	3	18	3	2	64
Others - Others	0	4	3	0	0	0	0	0	7
TOTAL	**149**	**440**	**496**	**39**	**36**	**409**	**277**	**168**	**2 014**
Total intra-area	82	152	271	13	17	126	117	81	859
Total inter-area	67	288	225	26	19	283	160	87	1 155
of which North-South	7	82	20	5	7	56	9	15	201

Source: ARPA DATA BASE: G.C. Cainarca, M.G. Colombo, S. Mariotti, C. Ciborra, G. de Michelis and M.G. Losano, *Tecnologie Dell'Informazione E Accordi Tra Imprese* (Fondazione Adriano Olivetti, Edizioni di Comunità, Milan, 1989), p. 107, in Ph. Gugler, *op.cit*, p. 196.

Note: (1) Corporate venture capital (equity participation), (2) corporate joint venture, (3) consortia involving joint R & D, (4) transfer of technology agreements, (5) sub-contracting, (6) licensing agreements, (7) supply agreements.

9. The data base provides information on the geographical distribution of the 2,014 agreements and the corresponding percentages.

Table 6

**Geographical distribution of co-operation agreements
in the field of information technology, 1980-1986**

Geographical areas	No. of agreements	Percentage
USA - USA	546	27.11
Europe - Europe	189	9.09
Japan - Japan	130	6.45
USA - Europe	375	18.62
USA - Japan	429	21.30
Europe - Japan	129	6.41
USA - Europe - Japan	14	0.70
USA - Other countries	91	4.52
Europe - Other countries	46	2.28
Japan - Other countries	64	3.18
Other countries - Other countries	7	0.35
Total	**2 014**	**100**

Source: ARPA DATA BASE: G.C. Cainarca, M.G. Colombo, S. Mariotti, C. Ciborra, G. de Michelis, and M.G. Losano, *Tecnologie Dell'Informazione E Accordi Tra Imprese*,(Fondazione Adriano Olivetti, Edizioni di Comunità, Milan, 1989), p. 92, in Ph. Gugler, *op.cit.*, p. 183.